SIEMENS

SIPART DR22

Serial SIPART 6DR2210 Bus Interface

Operating Instructions C79000-B7476-C155-03

Explanation to the manual C79000-G7476-C154

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1 Hardware: SIPART 6DR2210

Refer to the Instructions C79000-G7476-C154 for the installation and connections of the SES module 6DR2803-8A or -8C and the bus driver C73451-A347-B202.

Quick Reference - connection to PC-COM:

Name	DR-module Pin-No.		PC-COM	
			9 pin D-Sub Pin-No.	25 pin D-Sub Pin-No.
RxD	3	<-------->	3	2
TxD	2	<-------->	2	3
Gnd	7/8	<-------->	5	7

2 Software: Function "SIPART 6DR2210 bus interface"

2.1 Possible applications

The serial interface (SES) 6DR2803-8A or -8C and the bus driver C73451-A347-B202 can be used with the SIPART 6DR2210 for point-to-point or bus connections to personal computers, automation systems, control systems or process computers.

The protocol procedure described below and the data representation enable fast transfer of data between the devices on the one hand and also ensure high transmission reliability on the other (Hamming distance d = 4 for the data section).

2.2 General

Alternatively:

- SIPART DR bus interface
  - V.24/V.28 signals: Txd (103), Rxd (104) and Ground (102) (designations to CCITT V.24)
  - Up to 32 DR controllers possible on one bus (a bus driver is required with 4 or more controllers or long lines)
  - Transmission is also possible with TTY signals when using the bus driver
  - Half-duplex mode
  - (Full-duplex mode) - 300, 600, 1200, 2400, 4800, 9600 baud
  - Asynchronous mode
- RS485 bus interface

2.3 Software

2.3.1 Transmission procedure

- Character frame
  - 10-bit frame (start bit; 7 data bits of an ASCII character, starting with the LSB; parity bit; stop bit); rest position = 1 = High (TTL) = -15 to -5 or -3 V (V.28) = 20 mA (TTY)
  - Parity (cross-check sum) can be set to even or odd.
- Procedure
  - To DIN 66258, Part 1, configuration A or B (can be set); either with or without longitudinal redundancy check (Lrc) before (as 2 ASCII characters) or after the end-of-message character ETX
  - Longitudinal redundancy check possible either normal or complemented
  - Master/slave arrangement: the controller is passive, it only reacts to requests
  - See "Safety features, error handling" for procedure in event of fault.
- Protocol
  - 4 different time-optimized messages to the controller:
    - ▶ Command to a controller
    - ▶ Controller scan
    - ▶ Abbreviated scan (repetition of last valid scan)
    - ▶ Controller alarm scan

- Character conventions

STX	02H	
StNo	40H to 5FH	Station number, 32 possible addresses from 00 to 31
StNoA	60H to 7FH	Station number with alarm scan; StNoA = StNo + 20H
StNoA	60H to 7FH	Station number with alarm scan; StNoA = StNo + 20H to detect a supply voltage failure on the DR22; reset to StNo following scan
StNoB	20H to 3FH	Station number in case of unaccepted message; StNoB: = StNo - 20H for identification of - Commands on disabled pages - No enable or interrupted enable for parameterization or structuring
N0	40H to 5FH	Number of n0 bytes transmitted by computer (min. 1 = 40H, max. 32 = 5FH)
N1	60H to 7FH	Number of n1 bytes to be transmitted by DR22 (min. 1, max. 32) N1 = N0 + 20H
HiAd.0	40H to 5FH	High address
LoAd.1	ASCII 0 to 9, A to F	High nibble of the 8-Bit-in-page-address (30H to 39H, 41H to 46H) of 1st transmitted byte
LoAd.2	ASCII 0 to 9, A to F	Low nibble of the 8-Bit-in-page-address (30H to 39H, 41H to 46H) of 1st transmitted byte
Data byte	2*ASCII 0 to 9, A to F (30Hto39H,41Hto46H)	8 bit as 2 hexadecimal characters (sequence: high nibble, low nibble)
STN STN1 STA STA1	40H to 7FH 40H to 7FH 40H to 7FH 40H to 7FH	Current stati (new values) Stati, old values which have occurred since the last alarm scan and which have been obtained by bit-by-bit ORing of StA and StN once per DR22 cycle. StA is set to 00H following an alarm scan.
Lrc	7 Bit	Longitudinal redundancy check, block check character: obtained by EXORing all 7-bit characters excluding STX, including ETX; the parity bit for Lrc is formed from the 7 bit of the Lrc
Lrc.1	ASCII 0 to 7	High nibble of Lrc, (MSB = 0)
Lrc.2	ASCII 0 to 9, A to F	Low nibble of Lrc (in this case longitudinal redundancy check excluding ETX)
#	23H	Code to repeat the last valid request
ETX	03H	

- Block conventions

(Representation in chronological order from left to right, data transmitted by computer in 1st line, transmitted by the controller in 2nd line; examples according to block structure type 2).

*Command to a controller**

. . . STX,StNo,N0,HiAd.0,LoAd.1,LoAd.2, 2*n0 characters (data),ETX,Lrc . . . . . .
. . . . . STX,StNo or StNoB,ETX,Lrc . . . . . .

*controller scan **

. . . STX,StNo,N1,HiAd.0,LoAd.1,LoAd.2,ETX,Lrc . . . . . .
. . . . . STX,StNo,2*n1 characters (data),ETX,Lrc . . . . . .

Abbreviated controller scan (repetition of last valid scan, e.g. for cyclic image updating):**

. . STX,StNo,#,ETX,Lrc . . . . . .
. . . . . STX,StNo,2*n1 characters (data),ETX,Lrc . . . . . .

*controller alarm scan **

. . STX,StNoA,ETX,Lrc . . . . . .
. . . . . STX,StNo or StNoA ,STN,STA,ETX,Lrc . . . . . .

* The commas are not part of the message

2.3.2 Safety features, error handling

Error monitoring of the controller always refers to the receiver side of the controller; the transmitter side must be monitored by corresponding functions from the computer. Monitoring is used for the following task:

- Faulty data must be prevented from being transferred to the controller
- The controller must return to a defined initial status following transmission errors in order to be able to receive new messages

- Time-out A: message interval (CB) monitoring

  The monitoring time can be adjusted between 1 and 25 s or switched off by means of the structure switch S107. It is only effective in computer mode via the serial interface and is used to check whether computer readiness CB = 1 is still present. If messages do not follow in succession within the monitoring time, a computer failure is assumed and the CB signal of the serial interface is set to zero, i.e. the associated controller starts in stand-alone mode. Time-out A is retriggered by each complete, correctly received message, even if this message does not contain the CB signal.

  If computer failure has been detected, the message must contain CB in order to switch back to computer mode.

- Time-out B: character interval monitoring

  Monitoring time = 1 or 2 controller cycles (depending on when the last character was received with respect to the controller cycle). Once the controller has received an STX and its station address as the start-of-message, all further characters must occur in succession according to the monitoring time interval. A computer failure is assumed if the monitoring time is exceeded, the character position of the controller is reset to the original status. All characters received up to this point are ignored. This ensures that the controller is ready to receive new messages following a temporary computer failure even if the failure occurred during a message.

  Any message from the computer may be aborted at any time and the received message is declared as invalid by the time-out monitoring (time-out B = 1 or 2 controller cycles) or with the next start-of-message with STX; no reply is made.

- STX monitoring

  A message has to be started from the computer with STX (02H). The controller remains in the original status until it recognises an STX and its station number; only then will the internal interface course be established and the time-out B function initiated.

- ETX monitoring

  The controller expects an ETX (03H) at a fixed position.

- Lrc monitoring

  The longitudinal redundancy check Lrc is expected at the last position of the received message if structured accordingly. This is compared with the internal Lrc value generated during reception. If an error is detected, the received data are ignored and no response is sent.

  The Lrc is generated by EXORing all characters following the STX up to the last character to be transmitted before Lrc. Comparison with the received Lrc by means of the EXOR function must result in 00, or 7FH in the case of complementary Lrc formation. The Lrc results in a Hamming distance d = 4, without Lrc d = 2.

- Protection from power failure of values for parameterization and structuring transmitted via the interface

  The values are protected from power failure if the computer transmits the corresponding characters for end of parameterization/structuring at the end of the transmission and if the enable conditions for receiving data have not been changed in the meantime. The data are stored in a non-volatile EEPROM.

- Sequence of functions:

  Receive

  The controller receives the characters in an interrupt routine. The individual parities are checked for vertical parity during this interrupt and the horizontal parity is continuously generated once the station number has been received. The address and length are stored and a receiver buffer reserved according to the length. The data 1 to n0 are entered into the receiver buffer. The data are transferred at the end of the cycle from the receiver buffer to their destinations determined by the addresses HiAd, LoAd following EXT, and are then available as input values for the new cycle. The current results (output values) are calculated from these input values in the new cycle.

  Transmit

  The controller starts to transmit the data requested by the controller immediately after correctly receiving the query message. An auxiliary memory in the main memory RAM is used as a transmitter buffer for this purpose and is loaded once with the current process image during the controller cycle (but not when transmitting is taking place). The initial address of the data to be transmitted is determined by HiAd, LoAd and the number by n1. Transmission takes place sequentially from an interrupt routine and the vertical parity, bit and horizontal parity are generated.

  A special transmitter buffer area is not reserved for the transfer of parameters and structures to the computer which means that these values cannot be manually adjusted during transmission.

  Only the specified address ranges can be accessed via the SES. If other pages are addressed, an acknowledgement is made with a station number reduced by 20H. The messages are ignored.

- Parameterization/structuring via the SES (write → into the controller)

  Parameterization and structuring must be initiated via ST1 (start) (see page 24), followed by the messages with the parameter values or structures, and then terminated by ST1 (end). Either parameterization or structuring is possible. The two functions cannot be selected at the same time. The function first requested using ST1 (start) is carried out. The operational stati parameterization and structuring are displayed in the process level on w, x via the SES as a warning. The following appears: w:onPA; x:SES or w:StrU; x:SES. Parameterization/structuring on the front module has priority. Since message transfer with parameter and structure values is aborted or ignored when a front module entry is made, the multi-byte variables must always be accommodated without gaps between the bytes in the messages.

- Parameterization via the SES (write → into the controller)

  1. The computer reads ST2 *) :

Bit	ST2		
7	0	Process operation level is quit	} Enable conditions for parameterization via the SES
6	0	-	
5	0	MEM Err	
4	X	offline system **)	
3	X	onPA SES **)	
2	0	StrU SES	
1	0	Par. via Front module	
0	0	Struc. via Front module	

*) The bits of the STATi are represented in positive logic, i.e. the bits = 1 when they occur
**) x = don't care

  2. If the enable conditions are satisfied, the computer transmits ST1,bit7 = 1 (start parameterization).

  3. The controller receives ST1,bit7 = 1 in an interrupt routine and subsequently tests the enable conditions in the basic cycle. If the conditions are satisfied, onPA/SES is displayed on w/x. The keys +Δw/-Δw and + Δy/-Δy no effect. If the enable conditions are satisfied, the following parameter messages are each acknowledged with the addressed station number.
     If they are not satisfied, the message acknowledgement is made with the station number StNoB = StNo - 20H and the parameter messages are ignored.

  4. If parameter messages are transmitted without ST1,bit7 = 1 (start parameterization) having been transmitted previously a station number reduced by 20H is also transmitted and the messages are ignored.

  5. Once ST1,bit7 = 1 has been transmitted, the computer can transmit any number of parameter messages.

6. The DR22 stores each message for the destination into the RAM. The parameters are immediately effective in the process.

7. During the transfer of the parameter values, any additional messages (except structuring messages) can be exchanged between the computer and the DR22.

8. If the enable conditions change during transfer of the parameters (for example by parameterization on the front module), the acknowledgement is also made with the station number reduced by 20H and the message is not transferred to the RAM. Previously executed parameter messages have been transferred to the RAM and are therefore effective. They cannot be transferred to the EEPROM via ST1,bit6 = 1 (end of parameterization), however. ST1,bit7 = 1 (start parameterization) must be transmitted again for further parameter messages.

9. At the end of parameterization, the computer transmits ST1,bit6 = 1 (end parameterization).

10. The DR22 receives "End parameterization" but only accepts it if "Start parameterization" was previously present and the enable conditions have not changed in the meantime, and transfers the parameters from the RAM to the EEPROM (user memory).

11. The online parameters are stored in the RAM and are also effective if the computer does not transmit "End parameterization", but they are not stored in the non-volatile EEPROM. If a bus fault is present, the parameters can be transferred from the RAM to the EEPROM by switching to the parameterization level using the front module when the parameterization level is left again.

12. The computer reads ST2/ST3 after the maximum write time of 20 s:

Bit	ST2		ST3	
7	0	Process operating level is quit	0	—
6	0	-	0	Transmitting Yo-par. unsuccessful
5	0	MEM Err	1	Power on
4	0	offline system	0	Transmitting tv-par. unsuccessful
3	1	onPA SES	0	Sum err
2	0	SES StrU	0	ncon err
1	0	Par. via Front module	0	-PoS err
0	0	Struc. via Front module	0	nPoS err

and detects from ST3/bit 5 that a power failure was not present when the EEPROM was written. ST2/bit 3 provides the acknowledgement that the DR24 was controlled into online parameterization via the SES.

- Structuring via the SES (write → in the controller)

1. The computer reads ST2:

Bit	ST2		
7	0	Process operation level is quit	Release conditions for structuring via the SES
6	0	-	
5	0	MEM err.	
4	X	offline system	
3	X	onPA SES	
2	X	StrU SES	
1	0	Par. via front module	
0	0	Struc. via front module	

2. If the enable conditions are satisfied, the computer transmits ST1,bit5 = 1 (start structuring).

3. The controller receives ST1,bit5 in an interrupt routine and subsequently tests the enable conditions in the basic cycle.

   IIf the conditions are satisfied, the DR22 switches to offline mode, and StrU/SES is displayed on w/x. The LEDs and the y display are switched off, and the analog and binary outputs are blocked.
   The following structuring messages are each acknowledged with the addressed station number.
   If the conditions are not satisfied, the message acknowledgement is made with a station number reduced by 20H and the messages are ignored.

4. If the structuring messages are transmitted without "Start structuring" having been transmitted previously, they are also acknowledged with a station number reduced by 20H. The messages are ignored.
5. The computer can transmit any number of structuring messages once ST1,bit5 = 1 (start structuring) has been transmitted.
6. The controller transfers each message for the destination to the RAM. The modified structures are not yet effective because of the offline mode.
7. The structuring switch S101 to S107 may be contained in the structuring messages but are not transferred to the RAM. This means that the data must be entered manually on the front module if they are to be stored in the user memory (EEPROM).
8. Whilst the structuring messages are being transferred, any other additional messages (except onPA parameter messages) can be exchanged between the computer and the controller.
9. If the enable conditions change during transfer of the structures (for example by structuring on the front module), the acknowledgement is also made with the station number StNoB = StNo - 20H. The message is not transferred to the RAM. Previous structuring messages have been transferred to the RAM and are also effective by returning to online mode. They cannot be transferred to the EEPROM via ST1,bit4 (end structuring), however. ST1,bit5 = 1 (start structuring) must be transmitted again for further structuring messages.
10. At the end of structuring, the computer transmits ST1,bit4 = 1 (end structuring).
11. The controller receives "End structuring" but only accepts it if "Start structuring" was previously present and the enable conditions have not changed in the meantime. The structures are transferred from the RAM to the EEPROM. A return is made to online mode if no errors have been detected during the error check.
12. The structures are stored in the RAM if the computer does not transmit "End structuring" but are not effective because of the offline mode which is still present and are not stored in the non-volatile EEPROM.

    If a bus fault is present, offline mode can be selected again by switching over to structuring on the front module. These structures are also transferred to the EEPROM when the structuring level is left again.
13. The computer reads ST2/ST3 after the maximum write time of 20 s:

Bit	ST2		ST3	
7	0	Process operation is quit	0	—
6	0	-	0	Transmitting Yo-par. unsuccessful
5	0	MEM Err	1	Power on
4	1	offline system	0	Transmitting tv-par. unsuccessful
3	0	onPA SES	0	Sum err
2	1	StrU SES	0	ncon err
1	0	Par. via front	0	-PoS err
0	0	Struc. via front	0	nPoS err

It detects from ST3,bit5 that a power failure was not present during writing of the EEPROM and from ST3/bits 0 to 3, that no connection or positioning errors were present. ST3/bit 4 and ST2/bit 2 provide the acknowledgements for offline mode and structuring via the SES.

2.3.3 Offline parameters of the SES

1.	S102	Data transfer rate adjustable to:	9600, 4800, 2400, 1200, 600, 300 characters per second
2.	S105	Longitudinal parity formation:	0 = normal , 1 = complementary
3.	S104	Longitudinal parity position:	0 = without Lrc, 1 = Lrc after ETX, 2 = Lrc before ETX
4.	S103	Cross parity formation:	0 = even, 1 = odd
5.	S106	Station number:	0 to 31 (to 125 for PROFIBUS)
6.	S107	CB time monitoring	as a multiple of the cycle time: without, 1, 2 to 25 s.

2.3.4 Structure switch ”StrS”

Note: adjustable range is from 0 to “Max”
Contents: Addresses of the structure switch from the menu ”StrS”
HiAd: 41H
LoAd: 00H to 2EH

NAME	LoAd	Max	NOTES
S0	00H	254	Identification of the user memory
S1	01H	12	Controller type
S2	02H	2	Output structure
S3	03H	1	Power frequency suppression
S4	04H	1	Interconnection input range
S5	05H	3	input range: AE1
S6	06H	3	AE2
S7	07H	3	AE3
S8	08H	7	AE4
S9	09H	7	AE5
S10	0AH	1	Root extraction: AE1
S11	0BH	1	AE2
S12	0CH	1	AE3
S13	0DH	1	AE4
S14	0EH	1	AE5
S15	0FH	11	Alloc.: 0%,AE1,4,5... → FE1
S16	10H	11	0%,AE2,4,5... → FE2
S17	11H	11	0%,AE3,4,5... → FE3
S18	12H	11	0%,AE1,2,3,4 → FE4
S19	13H	11	0%,AE1,2,3,4 → FE5/6
S20	14H	1	Linearisation: I
S21	15H	1	II
S22	16H	6	Module location: 5 } assembling
S23	17H	6	6 }
S24	18H	19	Alloc.: CB } Binary inputs
S25	19H	18	He
S26	1AH	18	N
S27	1BH	18	Si
S28	1CH	18	BLS
S29	1DH	18	BLPS
S30	1EH	18	PI
S31	1FH	18	PII
S32	20H	18	PAU
S33	21H	18	+dw
S34	22H	18	-dw
S35	23H	18	+dy
S36	24H	18	-dy
S37	25H	18	+yBL
S38	26H	18	-yBL
S39	27H	1	Control signal: CB
S40	28H	1	BE direction of control action He
S41	29H	1	N
S42	2AH	1	Si
S43	2BH	1	PI/PII
S44	2CH	1	+dw/-dw
S45	2DH	1	+dy/-dy
S46	2EH	1	+yBL/-yBL

HiAd: 41H
LoAd: 2FH to 64H

NAME	LoAd	Max	NOTES
S47	2FH	2	Control signal: CB
S48	30H	1	N
S49	31H	2	Switch over: intern/extern
S50	32H	1	x-tracking
S51	33H	1	Set point at CB cut-out
S52	34H	1	Tracking:internal: internal set point
S53	35H	1	Source: external set point
S54	36H	1	Direction of control action controller I on xdI
S55	37H	3	D-element input controller I
S56	38H	1	Direction of control action controller II on xdII
S57	39H	3	D-element input controller II
S58	3AH	2	Selection of adaption
S59	3BH	2	Parameter control (PC)
S60	3CH	30	Control size for PC
S61	3DH	1	Priority N(DDC) or H
S62	3EH	1	Source: external manip. variable
S63	3FH	2	Man. control for meas. transd. dist.
S64	40H	4	Blocking: switch over H/A
S65	41H	1	K-controller: split range
S66	42H	1	DDC: ly-switching off
S67	43H	3	Manipulated variable display (MVD)
S68	44H	1	Direct. of control action of the MVD
S69	45H	1	Output signal: AA1
S70	46H	1	AA2
S71	47H	1	0/4 to 20 mA AA3
S72	48H	1	AA4
S73	49H	41	Alloc. on contr. signal: AA1
S74	4AH	41	AA2
S75	4BH	41	AA3
S76	4CH	16	Alloc.: RB
S77	4DH	16	Binary outputs RC
S78	4EH	16	H
S79	4FH	16	N
S80	50H	16	A1
S81	51H	16	A2
S82	52H	16	A3
S83	53H	16	A4
S84	54H	16	MTD
S85	55H	16	Int I
S86	56H	1	Direct. of contr. action: RB
S87	57H	1	Binary outputs RC
S88	58H	1	H
S89	59H	1	N
S90	5AH	1	A1/A2
S91	5BH	1	A3/A4
S92	5CH	1	MTD
S93	5DH	1	Int I
S94	5EH	37	Input A1, A2
S95	5FH	37	A3, A4
S96	60H	3	Function min/max: A1, A2
S97	61H	3	A3, A4
S98	62H	2	Setting & display A1 to A4
S99	63H	1	Re-start conditions
S100	64H	1	Optical signalling

- 1-byte structure switch which can only be read from the computer

Contents: Addresses of the structure switch from the menu ”StrS”
HiAd: 41H
LoAd: 65H to 6BH

NAME	LoAd	Max	NOTES
S101	65H	5	Data transfer
S102	66H	5	Baud rate
S103	67H	1	Cross parity
S104	68H	2	Longitudinal parity
S105	69H	1	Longitudinal parity normal/inverted
S106	6AH	125	Station number
S107	6BH	25	Time monitoring CBses

} SES

- byte structure switch which can be read/written from the computer

Contents: Addresses of the structure switch from the menu ”StrS”
HiAd: 41H
LoAd: 6CH to B2H

NAME	LoAd	Max	NOTES	
S200	6CH	3	Input range	AE6
S201	6DH	3		AE7
S202	6EH	3		AE8
S203	6FH	3		AE9
S204	70H	3		AE10
S205	71H	3		AE11
S206	72H	1	Root extraction:	AE6
S207	73H	1		AE7
S208	74H	1		AE8
S209	75H	1		AE9
S210	76H	1		AE10
S211	77H	1		AE11
S212	78H	11	Allocation	FE7
S213	79H	11		FE8
S214	7AH	11		FE9
S215	7BH	11		FE10
S216	7CH	11		FE11
S217	7DH	11		FE12
S218	7EH	18	Alloc. binary inputs:	BLB
S219	7FH	19		CBII
S220	80H	18		HeII
S221	81H	18		NII
S222	82H	18		SiII
S223	83H	18		/tSI
S224	84H	19		/tSII
S225	85H	19		/wSLI
S226	86H	19		/wSLII
S227	87H	18		+yBLI
S228	88H	18		-yBLII
S229	89H	1	Binary inputs: direction of control action	/tSI and /tSII
S230	8AH	1		/wSLI and /wSLII
S231	8BH	2	Output structure controller II	
S232	8CH	2	Switch over internalII/externalII	
S233	8DH	1	x-tracking controller II	
S234	8EH	1	set point at CBII cut-out	
S235	8FH	1	Tracking internal setpoint wiII	
S236	90H	2	Display ratio controller	
S237	91H	-	-	

Contents: Addresses of the structure switch from the menu "StrS"
HiAd: 41H (contd)
LoAd: 6CH to B2H (contd)

NAME	LoAd	Max	NOTES		
S238	92H	1	Priority NII (DDCII) or HII		
S239	93H	2	Manual control controller II for meas. transd. dist.		
S240	94H	4	Blocking: switch over HII/AII		
S241	95H	1	Function: split range controller II		
S242	96H	1	NII/DDCII: ly-switching off		
S243	97H	3	Manipulated variable display of controller II		
S244	98H	1	Direction of control action controller II		
S245	99H	1	Manipulated variable limit of controller I		
S246	9AH	1	Manipulated variable limit of controller II		
S247	9BH	1	Output signal:	AA5	
S248	9CH	1		AA6	
S249	9DH	1	0 to 20 mA	AA7	
S250	9EH	1		AA8	
S251	9FH	1		AA9	
S252	A0H	41	Alloc. on controller signal:	AA4	
S253	A1H	41		AA5	
S254	A2H	41		AA6	
S255	A3H	41		AA7	
S256	A4H	41		AA8	
S257	A5H	41		AA9	
S258	A6H	16	Alloc.: Binary outputs:	RBII	
S259	A7H	16		RCII	
S260	A8H	16		HII	
S261	A9H	16		NII	
S262	AAH	16		IntII	
S263	ABH	16		FE9	
S264	ACH	16		FE10	
S265	ADH	16		FE11	
S266	AEH	16		FE12	
S267	AFH	38	Input A2		
S268	B0H	38	Input A4		
S269	B1H	18	Allocation:	tS_StopI	1)
S270	B2H	18		tS_StopII	1)

1) from software version -C9 onwards

Meaning of contents of S15 to S19 and S212 to S217

Content	S15	S16	S17	S19	S18, S212 to S217
0H	0 %	0 %	0 %	0 %	0 %
1H	AE1A	AE2A	AE3A	AE1A	AE1A
2H	AE4A	AE4A	AE4A	AE2A	AE2A
3H	AE5A	AE5A	AE5A	AE3A	AE3A
4H	AE6A	AE6A	AE6A	AE5A	AE4A
5H	AE7A	AE7A	AE7A	AE6A	AE5A
6H	AE8A	AE8A	AE8A	AE7A	AE6A
7H	AE9A	AE9A	AE9A	AE8A	AE7A
8H	AEAA	AEAA	AEAA	AE9A	AE8A
9H	AEBA	AEBA	AEBA	AEAA	AE9A
AH	AE2A	AE1A	AE1A	AEBA	AEAA
BH	AE3A	AE3A	AE2A	AE4A	AEBA

2.3.5 Parameter ”onPA”

Contents: Addresses of the online parameters from the menu ”onPA”
HiAd: 40H
LoAd: 00H to 55H

NAME	LoAd	BYTE	TYPE	RANGE	DIM	NOTES
tFI	00H	2	LOG	OFF, 1.000 __ 1000	Sec.	OFF:=00H,00H
vvI	02H	2	”	0.100 __ 10.00	1	
cPI	04H	2	”	0.100 __ 100.0	1	
tnI	06H	2	”	1.000 __ 9984	Sec.	
tvI	08H	2	”	OFF, 1.000 __ 2992	Sec.	OFF:=00H,00H
AHI	0AH	2	LIN	0.000 __ 10.00	%	
YoI	0CH	2	”	AUTO, 0.000 __ 100.0	%	AUTO:=00H,01H
YAI	0EH	2	”	-10.000 __ 110.0	%	YAI ≤ YEI
YEI	10H	2	”	-10.000 __ 110.0	%	YAI ≤ YEI
tFII	12H	2	LOG	OFF, 1.000 __ 1000	Sec.	OFF:=00H,00H
vvII	14H	2	”	0.100 __ 10.00	1	
cPII	16H	2	”	0.100 __ 100.0	1	
tnII	18H	2	”	1.000 __ 9984	Sec.	
tvII	1AH	2	”	OFF, 1.000 __ 2992	Sec.	OFF:=00H,00H
AHII	1CH	2	LIN	0.000 __ 10.00	%	
YoII	1EH	2	”	AUTO, 0.000 __ 100.0	%	AUTO:=00H,01H
YAII	20H	2	”	-10.000 __ 110.0	%	YAII ≤ YEII
YEII	22H	2	”	-10.000 __ 110.0	%	YAII ≤ YEII
dr	24H	2	FIX	1 __ 100	1	Factor × tc
ty	26H	2	LOG	OFF 1.000 __ 1000	Sec.	
tA	28H	2	FIX	1 __ 30	1	Factor × 20 ms
tE	2AH	2	”	1 __ 30	1	Factor × 20 ms
tF1	2CH	2	LOG	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF2	2EH	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF3	30H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF4	32H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF5	34H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
c1	36H	2	FIX	-1999 __ 19999	0.1 %	00H,02H=0.001
c2	38H	2	”	-1999 __ 19999	0.1 %	”
c3	3AH	2	”	-1999 __ 19999	0.1 %	”
c4	3CH	2	”	-1999 __ 19999	0.1 %	”
c5	3EH	2	”	-1999 __ 19999	0.1 %	”
c6	40H	2	”	-1999 __ 1999	%	00H,02H=0.01
P01	42H	2	FIX	-1999 __ 19999	0.1 %	00H,02H=0.001
P02	44H	2	”	-1999 __ 19999	0.1 %	”
P03	46H	2	”	-1999 __ 19999	0.1 %	”
P04	48H	2	”	-1999 __ 19999	0.1 %	”
P05	4AH	2	”	-1999 __ 19999	0.1 %	”
P06	4CH	2	”	-1999 __ 19999	0.1 %	”
P07	4EH	2	”	-1999 __ 19999	0.1 %	”
P08	50H	2	”	-1999 __ 19999	0.1 %	”
P09	52H	2	”	-1999 __ 19999	0.1 %	”
P10	54H	2	”	-1999 __ 19999	0.1 %	”

HiAd: 59H
LoAd: 00H to 1DH

NAME	LoAd	BYTE	TYPE	RANGE	DIM	NOTES
P11	00H	2	FIX	-1999 __ 19999	0.1 %	00H,02H=0.001
P12	02H	2	”	-1999 __ 19999	0.1 %	”
P13	04H	2	”	-1999 __ 19999	0.1 %	”
P14	06H	2	”	-1999 __ 19999	0.1 %	”
P15	08H	2	”	-1999 __ 19999	0.1 %	”
tyII	0AH	2	LOG	OFF 1.000 __ 1000	Sec.	
tAII	0CH	2	FIX	1 __ 30	1	Factor × 20 ms
tEII	0EH	2	”	1 __ 30	1	Factor × 20 ms
tF6	10H	2	LOG	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF7	12H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF8	14H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tF9	16H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tFA	18H	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
tFb	1AH	2	”	OFF, 0.100 __ 1000	Sec.	OFF:=00H,00H
c7	1CH	2	FIX	-1999 __ 1999	%	00H,02H=0.01
c8	1EH	2	”	-1999 __ 19999	%	00H,02H=0.001
c9	20H	2	”	-1999 __ 19999	%	”

2.3.6 Parameter ”OFPA”

Contents: Addresses of the online parameters from the menu “oFPA”
HiAd: 40H
LoAd: 56H to 81H

NAME	LoAd	BYTE	TYPE	RANGE	DIM	NOTES
dPI	56H	2	FIX	0 __ 3	1	1)
dAI	58H	2	„	-1999 __ 19999	1	
dEI	5AH	2	„	-1999 __ 19999	1	
dPII	5CH	2	FIX	0 __ 3	1	1)
dAII	5EH	2	”	-1999 __ 19999	1	
dEII	60H	2	”	-1999 __ 19999	1	
A1	62H	2	LIN	-110 __ 110	%	2)
A2	64H	2	”	-110 __ 110	%	2)
A3	66H	2	”	-110 __ 110	%	2)
A4	68H	2	”	-110 __ 110	%	2)
H1.2	6AH	2	LIN	0.1 __ 20.0	%	for A1, A2
H3.4	6CH	2	”	0.1 __ 20.0	%	for A3, A4
SA	6EH	2	LIN	-10.0 __ 110.0	%	SA ≤ SE, 3)
SE	70H	2	”	-10.0 __ 110.0	%	SA ≤ SE, 3)
SH	72H	2	”	-10.0 __ 110.0	%	3)
Sb	74H	2	”	-10.0 __ 110.0	%	3)
tS	76H	2	LOG	OFF, 0.100 __ 9984	Min.	3)
VA	78H	2	FIX	0 __ 19999	0.1 %	vA ≤ vE
VE	7AH	2	”	0 __ 19999	0.1 %	vA ≤ vE
YS	7CH	2	LIN	-10.0 __ 110.0	%	
Y1	7EH	2	LIN	0.0 __ 100.0	%	
Y2	80H	2	”	0.0 __ 100.0	%	

HiAd: 5AH
LoAd: 00H to 15H

SAII	00H	2	LIN	-10.0 __ 110.0	%	SAII ≤ SEII
SEII	02H	2	”	-10.0 __ 110.0	%	SAII ≤ SEII
tSII	04H	2	LOG	OFF, 0.100 __ 9984	Min.	
YSII	06H	2	LIN	-10.0 __ 110.0	%	
Pd	08H	2	FIX	0 __ 3	1	Display
Ad	0AH	2	”	-1999 __ 19999	1	ratio
Ed	0CH	2	”	-1999 __ 19999	1	controller
H2.	0EH	2	LIN	0.1 __ 20.0	%	for A2
H4.	10H	2	”	0.1 __ 20.0	%	for A4
Y3	12H	2	LIN	0.0 __ 100.0	%	
Y4	14H	2	”	0.0 __ 100.0	%	

Comments:

1) Decimal interpretation:
0: 00H,00H = ----
1: 00H,02H = ---·⁻
2: 00H,04H = --·⁻⁻
3: 00H,06H = -·⁻⁻⁻

2) The display format for A1 to A4 is a function of the structure switches S94/S95 and S267/S268

S94/S95 S267/S268	INPUT	DISPLAY AND EVALUATION
0	xdI	dPI, dAI, dEI } for S1 = 4 and 6 only %
1	xI	”
2	wI	”
3	xv	”
4	wv	”
5	xdII	dPII, dAII, dEII
6	xII	”
7	wII	”
≥ 8	Y	%

3) The display format for supporting value parameters and specified value parameters as well as specified values is a function of the structure switch S1

S1	Evaluation: I) dPI, dAI, dEI; II) dPII, dAII, dEII								# Adjustment range ref. to dE* - dA* = 100 %
	Supporting value parameters		Setpoint parameters				Setpoint		
	(FE1) -1.1 to11.1	(FE3) -1.3 to11.3	SA	SE	SH	Sb	WiI	WiII	
0	I)	I)	I)	I)	I)	—	I)	—	-10 % to110 %
1	I)	I)	I)	I)	I)	—	I)	—	
2	I)	I)	I)	I)	I)	—	I)	—	
3	I)	I)	I)	I)	I)	—	I)	—	
4	%	%	—	—	I)	—	I)	—	-199.9 % to199.9 %
5	II)	I)	II)	II)	II)	—	I)	II)	-10 % to110 %
6	%	%	II)	II)	II)	—	I)	II)	-199.9 % to199.9 %
7	I)	II)	I)	I)	I)	II)	I)		-10 % to110 %
8	I)	II)	I)	I)	I)	II)	I)		
9	I)	II)	—	—	—	—	—	—	-10 % to110 %
10	I)	I)	I)	I)	—	—	I)	—	”
11	I)	I)	I)	I)	—	—	I)	—	”
12	I)	II)	I)	I)	—	—	I)	II)	”

dA* = -1999 to19999
dE* = -1999 to19999 (except S1 = 4 and S1 = 6)

Contents: Addresses of the offline parameters from the menu “oFPA” at S4:= 0/1
HiAd: 40H
LoAd: 82H to BDH

S4 = 0			S4 = 0/1			S4 = 1			
NAME	RANGE	DIM	LoAd	BYTE	TYPE	NAME	RANGE		DIM
-1.1	see comment 3) (above)	see comment 3) (above)	82H	2	LIN	-10/FU1	-199.9 __	199.9	%
0.1			84H	2	”	0/FU1	-199.9 __	199.9	%
1.1			86H	2	”	10/FU1	-199.9 __	199.9	%
2.1			88H	2	”	20/FU1	-199.9 __	199.9	%
3.1			8AH	2	”	30/FU1	-199.9 __	199.9	%
4.1			8CH	2	”	40/FU1	-199.9 __	199.9	%
5.1			8EH	2	”	50/FU1	-199.9 __	199.9	%
6.1			90H	2	”	60/FU1	-199.9 __	199.9	%
7.1			92H	2	”	70/FU1	-199.9 __	199.9	%
8.1			94H	2	”	80/FU1	-199.9 __	199.9	%
9.1			96H	2	”	90/FU1	-199.9 __	199.9	%
10.1			98H	2	”	100/FU1	-199.9 __	199.9	%
11.1			9AH	2	”	110/FU1	-199.9 __	199.9	%
-1.3	see comment 3) (above)	see comment 3) (above)	9CH	2	LIN	-10/FU2	-199.9 __	199.9	%
0.3			9EH	2	”	0/FU2	-199.9 __	199.9	%
1.3			A0H	2	”	10/FU2	-199.9 __	199.9	%
2.3			A2H	2	”	20/FU2	-199.9 __	199.9	%
3.3			A4H	2	”	30/FU2	-199.9 __	199.9	%
4.3			A6H	2	”	40/FU2	-199.9 __	199.9	%
5.3			A8H	2	”	50/FU2	-199.9 __	199.9	%
6.3			AAH	2	”	60/FU2	-199.9 __	199.9	%
7.3			ACH	2	”	70/FU2	-199.9 __	199.9	%
8.3			AEH	2	”	80/FU2	-199.9 __	199.9	%
9.3			B0H	2	”	90/FU2	-199.9 __	199.9	%
10.3			B2H	2	”	100/FU2	-199.9 __	199.9	%
11.3			B4H	2	”	110/FU2	-199.9 __	199.9	%
			B6H	2	FIX	PA /rE	10 __	1000	0.1 %
			B8H	2	”	PE /rE	100 __	9999	% 4)
			BAH	2	”	tA /rE	10 __	1000	0.1 %
			BCH	2	”	tE /rE	100 __	9999	% 4)

4) Interpretation of PE, tE:

An identification has been coded in bit 7 (MSB)

MSB = 0 → actual decimal value := stored FIX value/1000
→ range: 1.000 to 9.999
MSB = 1 → actual decimal value := stored FIX value/100
→ range: 10.00 to 99.99

2.3.7 Parameter ”PASt”

Contents: Addresses of the offline parameters from the menu ”PASt”
HiAd: 40H
LoAd: BEH to F1H

NAME	LoAd	BYTE	TYPE	RANGE	DIM	NOTES
vvc	BEH	2	LOG	0.100 __ 10.00	1	
cP1	C0H	2	LOG	0.100 __ 100.0	1	
cP3	C2H	2	”	”	1	
cP5	C4H	2	”	”	1	
cP7	C6H	2	”	”	1	
cP9	C8H	2	”	”	1	
tn1	CAH	2	LOG	1.000 __ 9984	Sec.	
tn3	CCH	2	”	”	”	
tn5	CEH	2	”	”	”	
tn7	DOH	2	”	”	”	
tn9	D2H	2	”	”	”	
tv1 *)	D4H	2	LOG	OFF, 1.000 __ 2992	Sec.	OFF:=00H,00H
tv3 *)	D6H	2	”	”	”	”
tv5 *)	D8H	2	”	”	”	”
tv7 *)	DAH	2	”	”	”	”
tv9 *)	DCH	2	”	”	”	”
AH1	DEH	2	LIN	0.000 __ 10.00	%	
AH3	E0H	2	”	”	%	
AH5	E2H	2	”	”	%	
AH7	E4H	2	”	”	%	
AH9	E6H	2	”	”	%	
Yo1 **)	E8H	2	LIN	AUTO, 0.000 __ 100.0	%	AUTO:=00H,01H
Yo3 **)	EAH	2	”	”	%	”
Yo5 **)	ECH	2	”	”	%	”
Yo7 **)	EEH	2	”	”	%	”
Yo9 **)	F0H	2	”	”	%	”

*) - In the exchange of “tv” parameters for “PASt” on oFF or ≠oFF, all 5 tv parameters in a message must be transmitted simultaneously with the value oFF or ≠oFF, otherwise the present values remain!

- If all 5 tv parameters are ≠oFF, they can be altered individually or in groups in their value (with the exception of oFF!) via the SES.
- Whether the transmission of at least one tv parameter has been successful or not, ST3.4 can be checked after the transmission by means of a scan to the status.
- If ST3.4 = 1, then transmission failed; if not, then it was successful.
- The current status ST3.4 remains until at least one new tv parameter (tv1,3,5,7,9) has been transmitted via the SES. The status is updated according to success!

**) As for *), but:

AUto	instead of	oFF
Y0	instead of	tv
ST3.6	instead of	ST3.4

2.3.8 Parameter "CAE4"/"CAE5"

- Parameters which can be read/written from the computer

HiAd: 5AH

Name dd2	Name dd3	LoAd	Byte	TYPE	Setting range	Dimension	Parameter meaning
SEnS	AE4	80H	1	BIN	0 to 7		Sensor type [1]
unit	AE4	81H	1	BIN	0 to 2		Temperature unit [2]
tc	AE4	82H	1	BIN	0 to 10		Thermocouple type [3]
Mr	AE4	83H	2	FIX	0.00 to 100.00	Ohm	Line resistance PT100 2-wire [4]
tb	AE4	85H	2	FIX	0.0 to 400.0	degree	Temperature reference point [5]
MP	AE4	87H	2	FIX	0 to 3		Decimal point
MA	AE4	89H	2	FIX	-1999 to 19999		Range start
ME	AE4	8BH	2	FIX	-1999 to 19999		Range end
CA	AE4	8DH	2	FIX			Calibration range start
CE	AE4	8FH	2	FIX			Calibration range end
SEnS	AE5	91H	1	BIN	0 to 7		Sensor type [1]
unit	AE5	92H	1	BIN	0 to 2		Temperature unit [2]
tc	AE5	93H	1	BIN	0 to 10		Thermocouple type [3]
Mr	AE5	94H	2	FIX	0.00 to 100.00	Ohm	Line resistance PT100 2-wire [4]
tb	AE5	96H	2	FIX	0.0 to 400.0	degree	Temperature reference point [5]
MP	AE5	98H	2	FIX	0 to 3		Decimal point
MA	AE5	9AH	2	FIX	-1999 to 19999		Range start
ME	AE5	9CH	2	FIX	-1999 to 19999		Range end
CA	AE5	9EH	2	FIX			Calibration range start
CE	AE5	A0H	2	FIX			Calibration range end

[1] 0 → mV linear (without message of line breakage)
1 → Thermocouple internal reference point
2 → Thermocouple external reference point
3 → Pt100 4-wire
4 → Pt100 3-wire
5 → Pt100 2-wire
6 → Resistor R < 600 Ohm
7 → Resistore R < 2.8 KOhm

[2] only for SEnS = 1 to 5
0 → Degree Celsius
1 → Degree Fahrenheit
2 → Degree Kelvin (absolute)

[3] only for SEnS = 1 to 2
0 → TYPE L
1 → TYPE J
2 → TYPE K (Display "H")
3 → TYPE S
4 → TYPE B
5 → TYPE R
6 → TYPE E
7 → TYPE N
8 → TYPE T
9 → TYPE U
10 → any (without linearisation)

[4] only for SEnS = 5

[5] only for SEnS = 2

2.3.9 Function definitions ”FdEF”

Address of blocks which can not be activated (contents = 00H) or which can be activated (contents = C0H)

NAME	LoAd	BYTE	NOTES
-	00H	1	reserved
Ar1 Ar2 Ar3 Ar4 Ar5 Ar6	01H 02H 03H 04H 05H 06H	1 1 1 1 1 1	Arithmetic
FU1 FU2	07H 08H	1 1	Function generator (Lineariser)
MA1 MA2 MA3	09H 0AH 0BH	1 1 1	MAX selection
Mi1 Mi2 Mi3	0CH 0DH 0EH	1 1 1	MIN selection
rE1	0FH	1	Correction computer
AS1 AS2 AS3 AS4 AS5	10H 11H 12H 13H 14H	1 1 1 1 1	Analog switch
Co1 Co2	15H 16H	1 1	Comparator
nA1 nA2	17H 18H	1 1	nand
no1 no2	19H 1AH	1 1	nor

2.3.10 Function connection ”FCon”

The content of the interconnectable inputs determines the output (see next table)

Contents: FCon sinks (inputs)
HiAd: 49H

NAME	LoAd	BYTE
Ar1.1	00H	1
Ar1.2	01H	1
Ar1.3	02H	1
Ar1.4	03H	1
Ar1.5	04H	1
Ar2.1	05H	1
Ar2.2	06H	1
Ar2.3	07H	1
Ar2.4	08H	1
Ar2.5	09H	1
Ar3.1	0AH	1
Ar3.2	0BH	1
Ar3.3	0CH	1
Ar3.4	0DH	1
Ar3.5	0EH	1
Ar4.1	0FH	1
Ar4.2	10H	1
Ar4.3	11H	1
Ar4.4	12H	1
Ar4.5	13H	1
Ar5.1	14H	1
Ar5.2	15H	1
Ar5.3	16H	1
Ar5.4	17H	1
Ar5.5	18H	1
Ar6.1	19H	1
Ar6.2	1AH	1
Ar6.3	1BH	1
Ar6.4	1CH	1
Ar6.5	1DH	1
FE1	1EH	1
FE2	1FH	1
FE3	20H	1
FE4	21H	1
FE5	22H	1
FE6	23H	1
FU1.1	24H	1
FU2.1	25H	1
MA1.1	26H	1
MA1.2	27H	1
MA1.3	28H	1
MA2.1	29H	1
MA2.2	2AH	1
MA2.3	2BH	1
MA3.1	2CH	1
MA3.2	2DH	1
MA3.3	2EH	1
Mi1.1	2FH	1
Mi1.2	30H	1
Mi1.3	31H	1

NAME	LoAd	BYTE
Mi2.1	32H	1
Mi2.2	33H	1
Mi2.3	34H	1
Mi3.1	35H	1
Mi3.2	36H	1
Mi3.3	37H	1
rE1.1	38H	1
rE1.2	39H	1
rE1.3	3AH	1
AS1.1	3BH	1
AS1.2	3CH	1
AS1.3	3DH	1
AS2.1	3EH	1
AS2.2	3FH	1
AS2.3	40H	1
AS3.1	41H	1
AS3.2	42H	1
AS3.3	43H	1
AS4.1	44H	1
AS4.2	45H	1
AS4.3	46H	1
AS5.1	47H	1
AS5.2	48H	1
AS5.3	49H	1
Co1.1	4AH	1
Co1.2	4BH	1
Co1.3	4CH	1
Co2.1	4DH	1
Co2.2	4EH	1
Co2.3	4FH	1
nA1.1	50H	1
nA1.2	51H	1
nA1.3	52H	1
nA2.1	53H	1
nA2.2	54H	1
nA2.3	55H	1
no1.1	56H	1
no1.2	57H	1
no1.3	58H	1
no2.1	59H	1
no2.2	5AH	1
no2.3	5BH	1
FE7	5CH	1
FE8	5DH	1
FE9	5EH	1
FE10	5FH	1
FE11	60H	1
FE12	61H	1

Identifications of outputs which can be entered into the FCon sinks (HiAd 49H)

RESPONSE	CODE
ncon	00H
AE1A	01H
AE2A	02H
AE3A	03H
AE4A	04H
AE5A	05H
Ar1.6	06H
Ar2.6	07H
Ar3.6	08H
Ar4.6	09H
Ar5.6	0AH
Ar6.6	0BH
FU1.2	0CH
FU2.2	0DH
MA1.4	0EH
MA2.4	0FH
MA3.4	10H
Mi1.4	11H
Mi2.4	12H
Mi3.4	13H
P01	14H
P02	15H
P03	16H
P04	17H
P05	18H
P06	19H
P07	1AH
P08	1BH
P09	1CH
P10	1DH
rE1.4	1EH
-1.000	1FH
-.500	20H
-.250	21H
-.050	22H
0.000	23H
0.050	24H
0.100	25H
0.200	26H
0.500	27H
1.000	28H
1.050	29H
AS1.4	2AH
AS2.4	2BH
AS3.4	2CH
AS4.4	2DH
AS5.4	2EH
Co1.4	2FH
Co2.4	30H
nA1.4	31H
nA2.4	32H

RESPONSE	CODE
no1.4	33H
no2.4	34H
P11	35H
P12	36H
P13	37H
P14	38H
P15	39H
AE6A	3AH
AE7A	3BH
AE8A	3CH
AE9A	3DH
AEAA	3EH
AEBA	3FH
BE01	40H
BE02	41H
BE03	42H
BE04	43H
BE05	44H
BE06	45H
BE07	46H
BE08	47H
BE09	48H
AE1 ↳	49H
AE2 ↳	4AH
AE3 ↳	4BH
AE4 ↳	4CH
AE5 ↳	4DH
AE↳	4EH
A1	4FH
A2	50H
A3	51H
A4	52H
Int1	53H
Int2	54H
wi1/SPi1	55H
wi2/SPi2	56H
w1/SP1	57H
w2/SP2	58H
yI	59H
yII	5AH
SAA1	5BH
SAA2	5CH
SAA3	5DH
SAA4	5EH

Example:
Input correction computer (rE1) = AE4A
Input lineariser 2 (FU2) = Output Ar2

HiAd	LoAd	Contents
49H	38H	04H
49H	25H	07H

2.3.11 Position functions ”FPoS”

Time processing of the defined functions is described by 1 byte which contains the function identification.

HiAd: 4DH
LoAd: 00H to 1EH for nr01 to nr31
contains the function identifications described in FdEF (e.g. 0AH for MA2)
Special case: nPoS = 00H

Example:

Block nr04 is set with Ar5

HiAd	LoAd	Contents	
4D	03H	05H	FdEF identification

2.3.12 Contents of status register and process variables

- Data which can only be read from the computer

Contents: Process variables (2 byte), stati (1 byte) which can only be read from the computer
HiAd: 45H
LoAd: 80H to DAH

NAME	LoAd	BYTE	TYPE	NOTES
VERSION	80H	1	STATUS	Software version→ 01H = 1. version
GRT TYPE	81H	1	”	Apparatus type → 01H = Controller DR22
wEΔ	82H	2	LIN	ext. specified value wext, adjustable via +dw, -dw
xd s	84H	2	”	Difference S-controller xds
BA 1	86H	1	STATUS	effect. bin. output: BA8 (MSB) to BA1 (LSB)
BA 2	87H	1	”	effect. bin. output: BA16 (MSB) to BA9 (LSB)
BE 1	88H	1	STATUS	effect. bin. input: BE8 (MSB) to BE1 (BIT 0 = LSB)
BE 2	89H	1	”	effect. bin. input: BE14 (BIT 5) to BE9 (LSB)
AA1	8AH	2	LIN	Hardware analog output (% of output range)
AA2	8CH	2	”	”
AA3	8EH	2	”	”
AA4	90H	2	”	”
Y1	92H	2	LIN	Split range output y1 [%]
Y2	94H	2	”	Split range output y2 [%]
y	96H	2	”	Controller output y [%]
xdI	98H	2	LIN	Controller I: xd [%]
xI	9Ah	2	”	x [%]
wI	9CH	2	”	w [%]
wiI	9EH	2	”	wvi,wi/wv [%]
XVI	A0H	2	”	xv [%]
WVI	A2H	2	”	wv [%]
YI	A4H	2	”	y [%]
XDII	A6H	2	LIN	Controller II: xd [%]
XII	A8H	2	”	x [%]
WII	AAH	2	”	w [%]
wiII	ACH	2	”	wi [%]
YII	AEH	2	”	y [%]
E 1	B0H	2	LIN	Analog sink FE1: freely interconnectable range
E 2	B2H	2	”	” FE2: ”
E 3	B4H	2	”	” FE3: ”
E 4	B6H	2	”	” FE4: ”
E 5	B8H	2	”	” FE5: ”
E 6	BAH	2	”	” FE6: ”

NAME	LoAd	BYTE	TYPE	NOTES
AE1A	BCH	2	LIN	Analog sink AE1: (f,r,l); [f = filtert]
AE2A	BEH	2	”	” AE2: (f,r,l); [r = root extracted]
AE3A	C0H	2	”	” AE3: (f,r,l); [l = linearised]
AE4A	C2H	2	”	” AE4: (f,r,l)
AE5A	C4H	2	”	” AE5: (f,r,l)
AE1	C6H	2	LIN	Hardware analog input (% of output range)
AE2	C8H	2	”	”
AE3	CAH	2	”	”
AE4	CCH	2	”	”
AE5	CEH	2	”	”
ST8	D0H	1	STATUS	(CB,H.,Si,N,PI,PII,+yBL,-BL)
ST9	D1H	1	“	(BLS,BLPS,PAU,0,+dy,-dy,+dw,-dw)
STN	D2H	1	“	(0,0/1,MUFS,0,A4,A3,A2,A1)
STN1	D3H	1	“	(0,0/1,0,I1,I2,0,H ext, Y ext)
STA	D4H	1	“	
STA1	D5H	1	“	
ST2	D6H	1	“	
ST3	D7H	1	“	
ST10	D8H	1	STATUS	CBII,HII,SII,NII,0,tSII,+yBLII,-yBLII
ST11	D9H	1	“	Measuring transducer disturbance (MTD)
ST12	DAH	1	“	Option error, tSII,BLB,WSLI,WSLII,MTD

- Data which can only be read from the computer

Contents: Process variables which can only be read from the computer
HiAd: 45H
LoAd: 00H to 31H

NAME	LoAd	BYTE	TYPE	NOTES
AE6A	00H	2	LIN	Analog sink: AE6(F,r,l)
AE7A	02H	2	”	AE7(F,r,l)
AE8A	04H	2	”	AE8(F,r,l)
AE9A	06H	2	”	AE9(F,r,l)
AEAA	08H	2	”	AEA(F,r,l)
AEBA	0AH	2	”	AEB(F,r,l)
AE6	0CH	2	LIN	Hardware analog inputs: AE6 (% of output range)
AE7	0EH	2	”	AE7 (% of output range)
AE8	10H	2	”	AE8 (% of output range)
AE9	12H	2	”	AE9 (% of output range)
AEA	14H	2	”	AE10 (% of output range)
AEB	16H	2	”	AE11 (% of output range)
E7	18H	2	LIN	Analog sink: FE7
E8	1AH	2	”	FE8
E9	1CH	2	”	FE9
E10	1EH	2	”	FE10
E11	20H	2	”	FE11
E12	22H	2	”	FE12
AA5	24H	2	LIN	Hardware analog outputs: AA5 (% of output range)
AA6	26H	2	”	AA6 (% of output range)
AA7	28H	2	”	AA7 (% of output range)
AA8	2AH	2	”	AA8 (% of output range)
AA9	2CH	2	”	AA9 (% of output range)
Y3	2EH	2	LIN	Split range y3 (Controller II)
Y4	30H	2	”	Split range y3 (Controller II)

- Data which can be read/writte from the computer

HiAd: 45H
LoAd: E0H to FEH

NAME	LoAd	BYTE	TYPE	NOTES
ST1	E0H	1	STATUS	PARAM, STRUCT,...
Wes (Wves)	E1H	2	LIN	wext
ST4	E3H	1	STATUS	CB, Hext,...
Yes	E4H	2	LIN	yext
ST5	E6H	1	STATUS	BLS, BLPS,...
ST6	E7H	1	STATUS	BA8,...BA1
ST7	E8H	1	STATUS	BA16,...BA9
wi1es,wiIIes	E9H	2	LIN	
wi2es,wiIIes	EBH	2	LIN	
YHes	EDH	2	LIN	
YIIHes	EFH	2	LIN	
ST20	F1H	1	STATUS	CBII, HextII,...
WesII	F3H	2	LIN	
YesII	F5H	2	LIN	
SAA1	F7H	2	LIN	interconnectable sources: SAA1
SAA2	F9H	2	”	SAA2
SAA3	FBH	2	”	SAA3
SAA4	FDH	2	”	SAA4

Contents: status register which can be written
HiAd: 45H
LoAd: E0H, 1 Byte

Byte ST1	Meaning	
Bit	SES parameterize/structure/acknowledge	
7	Online parameterization via SES → start	1)
6	Online parameterization via SES → end	1)
5	Strukture via SES → start	2)
4	Strukture via SES → end	2)
3	Acknowledge via enter key	3)
2	Acknowledge via exit key	3)
1	don’t care	4)
0	don’t care	4)

1) Includes: onPA, AdAP
2) Includes: oFPA, StrS, PASt, FdEF, FCon, FPoS, CAE4, CAE5
3) If evaluated in Software
4) No effect

Writing into/reading
HiAd: 45H
LoAd: E3H, 1 Byte

Byte ST4	Meaning	
Bit	SES Control signals	
7	SES: CB (Computer readiness)	
6	SES: He_{ES} = f(S64) H ext. (”Hand”)	1)
5	SES: Sa (Safety)	
4	SES: T (Tracking)	
3	SES: PI → Switch over from Pi to P (Controller I)	
2	SES: PII → Switch over from Pi to P (Controller II)	
1	SES: +yBL (+y blocking)	
0	SES: -yBL (-y blocking)	

1) S64 < 4 dependant from CB and Int
S64 = 4 independant from CB or Int
S64 = 3,4 He_{ES} dynamic as Hi

Writing into/reading
HiAd: 45H
LoAd: F1H

Byte ST20	Meaning		
Bit	SES Control signals		
7	SES: CBII (Computer readiness)	Controller 2 to S1=12	
6	SES: $HII_{ext.}$ (”Hand”)	Controller 2 to S1=12	1)
5	SES: SiII (Safety)	Controller 2 to S1=12	
4	SES: NII (Tracking)	Controller 2 to S1=12	
3	SES: w_{SL}II	Controller 2 to S1=12	
2	SES: tSII	Controller 2 to S1=12	
1	SES: +yBLII (+y blocking)	Controller 2 to S1=12	
0	SES: -yBLII (-y blocking)	Controller 2 to S1=12	

1) Function of S240, i.e. at S240 = 1 → H: = 0

Writing into/reading
HiAd: 45H
LoAd; E6H, 1 Byte

Byte ST5	Meaning	
Bit	SES Control signals	
7	SES: BLS (blocking „StrU”)	
6	SES: BLPS (blocking „Mode”)	1)
5	SES: PAS (parameter switch over)	
4	SES: Int I_{ES} (internal setpoint controller I)	
3	SES: Int II_{ES} (internal setpoint controller II)	
2	SES: tSI	
1	SES: w_{SL}I	
0	SES: BLB	

1) ”Mode”: quitting the process operation level

Writing into/reading

HiAd: 45H HiAd: 45H
LoAd: E7H LoAd: E8H

Byte ST6[1]		Byte ST7[1]	
Bit	SES binary outputs	Bit	SES binary outputs
7	SES: BA8	7	SES: BA16
6	SES: BA7	6	SES: BA15
5	SES: BA6	5	SES: BA14
4	SES: BA5	4	SES: BA13
3	SES: BA4	3	SES: BA12
2	SES: BA3	2	SES: BA11
1	SES: BA2	1	SES: BA10
0	SES: BA1	0	SES: BA9

1) Only the binary outputs which have not been allocated (S76 to 85 = 0 resp. S258 to S266) can be set by the SES.

The signals are presented in positive logic, i.e. on occurence of the corresponding signals, the bits = „1". The status registers ST1, ST4 to ST7 can be written/read via the SES.

Contents of the read-only process variables

HiAd: 45H
LoAd: D6H, 1 Byte

Byte ST2	Meaning		
Bit	Enable conditions/Status messages		
7	STATUS:	Process operation level is quit	1)
6	0		
5	ERROR:	MEM Err	1)
4	STATUS:	Offline system	2)
3	STATUS:	onPA SES	2)
2	STATUS:	StrU SES	2)
1	STATUS:	Parameterizing via front module	1)
0	STATUS:	Structurizing via front module	1)

1) Enable conditions for parameterizing/structurizing via the SES
2) "don't care" for enable conditions

only readable
HiAd: 45H
LoAd: D7H, 1 Byte

Byte ST3	Meaning		
Bit	Error-/status messages		
7	STATUS:	Last change of Hand or internal 0 = Front, 1 = SES	
6	ERROR:	Transmitting the param. Y01,3,5,7,9 failed	5)
5	STATUS:	Power on	3)
4	ERROR:	Transmitting the param. tv1,3,5,7,9 failed	4)
3	ERROR:	Sum error	1)
2	ERROR:	ncon Err (highest priority)	2)
1	ERROR:	-PoS Err	2)
0	ERROR:	nPos Err (lowest priority)	2)

1) OR linking of bits ST3.0 to ST3.2
2) Cannot be acknowledged
3) Is automatically erased after first alarm scan by the controller
4) In the exchange of the „tv" parameter for „PASt" on „oFF" or „≠oFF" , all 5 tv parameters must be transmitted simultaneously, otherwise the present values remain! If all 5 tv parameters ≠oFF, they can be altered individually or in groups in their value (with the exception of "oFF" !) via the SES.
5) As for point 4), but „AUto" instead of „oFF" and „Y0" instead „tv"

only readable
HiAd: 45H
LoAd: D0H, 1 Byte

Byte ST8	Meaning	
Bit	Actual, effective signals in the controller	
7	CB (Computer readiness)	
6	H (effective "Hand")	1)
5	Si (Safety)	
4	T (Tracking)	
3	PI → Switch over from Pi to P (Controller I)	
2	PII → Switch over from Pi to P (Controller II)	
1	+yBL (+y blocking)	
0	-yBL (-y blocking)	

1) S64 function, i.e. at S64=1 →H:=0
H = Hi ∨ He

only readable
HiAd: 45H
LoAd: D1H, 1 Byte

Byte ST9	Meaning	
Bit	Actual, effective signals in the controller	
7	BLS (blocking "StrU")	
6	BLPS (blocking "Mode")	1)
5	PAU (Parameter switch over)	
4	Controller I/II for override control	2)
3	+dy (incremental y)	
2	-dy (incremental y)	
1	+dw (incremental w)	
0	-dw (incremental w)	

1) "Mode": Quitting the process operation level
2) Controller I: "0", Controller II: "1"

only readable
HiAd: 45H
LoAd: D2H, 1 Byte

HiAd: 45H
LoAd: D4H

Byte STN	Meaning	STA 2)
Bit	Status in the alarm message	Old status
7	manual variable I changed, not transmittable in the alarm message	0 3)
6	0: In the normal message, 1: In the alarm message	1
5	MTD (Measuring transducer disturbance)	MTD
4	CONTROLLER I/II at override regulation	Controller I/II
3	A4 (Limit monitor channel 4)	A4
2	A3 (Limit monitor channel 3)	A3
1	A2 (Limit monitor channel 2)	A2
0	A1 (Limit monitor channel 1)	A1

1) Controller I: "0", Controller II: "1"
2) "STN" stored high states since the last alarm scan.
3) from software -C9 onwards

only readable
HiAd: 45H HiAd: 45H
LoAd: D3H, 1 Byte LoAd: D5H

Byte STN1	Meaning	STA [2]
Bit	Status in the alarm message	Old status
7	manual variable II changed, not transmittable in the alarm message	0[3]
6	tS_Stop I 1: In the alarm message	1 [3]
5	tS_Stop II	0 [3]
4	I(1) (Internal, Controller I)	I(1)
3	I(2) (Internal, Controller II)	I(2)
2	0	0
1	H (effective „Hand") [1]	H
0	Yext. (Y external)	Yext

[1] H = Hi ∨ He
[2] "STN" stored high states since the last alarm scan.
[3] from software -C9 onwards

only readable
HiAd: 45H
LoAd: D8H

Byte ST10	Meaning
Bit	
7	CBII (Controller II if S1=12)
6	HII (Controller II if S1=12)
5	SiII (Controller II if S1=12)
4	NII (Controller II if S1=12)
3	Last change HandII or InternII (0:Front/1:SES)
2	tSII (Controller II if S1=12)
1	+yBLII (y-blocking [up] Controller II if S1=12)
0	-yBLII (y-blocking [down] Controller II if S1=12)

only readable
HiAd: 45H
LoAd: D9H

Byte ST11	Meaning
Bit	
7	Measuring transducer disturbance (MTD): AE8
6	AE7
5	AE6
4	AE5
3	AE4
2	AE3
1	AE2
0	AE1

only readable
HiAd: 45H
LoAd: DAH

Byte ST12	Meaning
Bit	
7	Error option (2/3/5/6)
6	tSI
5	BLB
4	w_{SL}I
3	w_{SL}II (Controller II at S1=12)
2	MTD: AE11
1	MTD: AE10
0	MTD: AE9

2.3.13 Addresses for batch mode

Copy of freely interconnectable area

HiAd	LoAd	NOTES
46H 49H 4DH	00H-1AH 00H-61H 00H-1EH	FdEF: Function codes FCon: Sinks FPos: Position list

Copy of strukture devices

HiAd	LoAd	NOTES
41H	00H-B0H	StrS: Offline mode

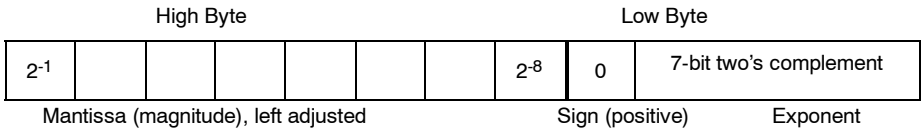
Copy of parameters

HiAd	LoAd	NOTES
40H 59H	00H-55H 00H-23H	onPA: Online parameters
40H 5AH	56H-BDH 00H-15H	oFPA: Offline parameters
40H	BEH-F1H	PAST: Offline parameters
5AH	80H-A1H	CAE4/CAE5: Offline parameters

2.3.14 Representation of parameters and process variables

Compared to the DR22-internal floating-point representation, the parameters are transmitted in three different compressed 2-byte representations.

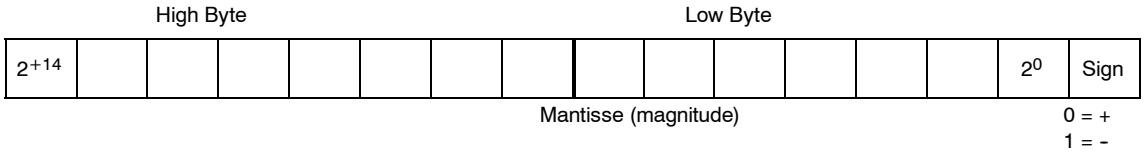
- **LOG**



Examples:

1.			1.000	=	80H, 01H (= 0.5 × $2^{1)}$
2.	Smallest parameter value	=	0.100	=	CDH, 7DH (approximation)
3.	Largest parameter value	=	9984	=	9CH, 0EH
Special case: parameter		=	oFF	=	00H,00H

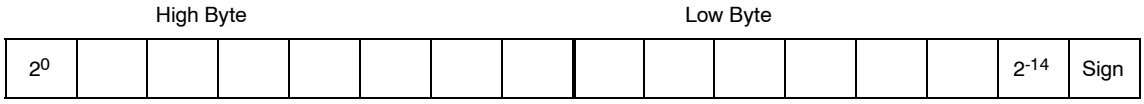
- **FIX**



Examples:

1.			1	=	00H, 02H
2.	Smallest parameter value	=	-1999	=	0FH, 9FH
3.	Largest parameter value	=	9999	=	4EH, 1EH

- **LIN**



Examples:

1.			100.0 %	=	1.000	=	80H, 00H
2.	Smallest parameter value	=	-199.9 %	=	-1.999	=	FFH, DFH (approximation)
3.	Largest parameter value	=	199.9 %	=	1.999	=	FFH, DEH (approximation)
4.	Special case: parameter	=	AUto	=	00H, 01H		

- **Process variables (LIN)**

  The process variables are transmitted in a compressed 2-byte representation (LIN).

2.3.15 Copy protection by means of a keyword

From the software version C5 onwards, the configuration, consisting of

oFPA, CLPA, HdEF, CAE4/5, FdEF, FPoS

can be write and read protected by means of a programmable keyword.

Activating the copy protection:

- Writing 3 bytes to HiAd 7FH/LoAd 30H
  The 1st and 2nd bytes make up the keyword, the 3rd byte must be the sum of these two bytes
  e.g.: 2AH, 18H, 42H
- Keep the keyword in a safe place
- Written values can be reread from the address HiAd 7FH/LoAd 80H
- The copy protection is activated the next time the device is switched on

Changing configuration when the copy protection is activated:

- Writing the 2-byte keyword to HiAd 7FH/LoAd 30H
- The copy protection will be disabled for 4 to 6 minutes

Deactivating the copy protection:

- Writing the 2-byte keyword to HiAd 7FH/LoAd 30H
- Writing FFH to HiAd 7FH/LoAd 30H: FFH removes the copy protection permanently

Effect of the copy protection:

- When reading the configuration, 00H will be transmitted instead of the data
- Any attempt to write onto protected areas will be acknowledged with StNoB in the response
- If an attempt is made to disable the copy protection with the wrong keyword, an attempt can only be repeated after a defined time (dependent on the number of failed attempts)

1st failed attempt:	ca. 1 min.
2nd failed attempt:	ca. 5 min.
3rd failed attempt:	ca. 10 min.
each further attempt:	ca 1.5 hrs.

3 PROFIBUS

3.1 PROFIBUS Module

The PROFIBUS module 6DR2803-8P can also be used in the serial interface slot on all SIPART DR controllers. This module works as a slave and supports communication in accordance with the DP standard (cyclic services), with software version -C1 upwards also acyclic services (DP-V1). The module has been certified with the no. Z00177 by the PNO (PROFIBUS user organization). The 9-pin connector pin assignment corresponds with the standard EN50170

The device data base files (GSD) DR0200A7.GSD and DR0300A7.GSD (software version -C4 upwards) accompany this and can also be downloaded from the Internet at www.ad.siemens.de/csi/gsd PROFIBUS GSD files/Control.

Special programs (standard function blocks) are available for the Siemens PLC Simatic S5/S7 masters to allow interfacing with the SIPART DR.

The file DR0200A7.GSD is already contained in the PROFIBUS configuration tool from Siemens. It is also required when the standard function blocks (FB) are used.

The file DR0300A7.GSD is recommended (from software version -C4!) if the standard function blocks (FB) are not to be used for S5/S7 or a different master is used.

3.2 Preparations before Operation

3.2.1 Settings on the SIPART DR Device

The serial interface on the device must be configured in the following way:

- Interface on (if possible, e.g. DR19, DR21)
- Even parity
- Without LRC
- Baud rate 9600
- Parameters/process values writable (as desired)
- Station number 0-125 (each number may only be used once)

3.2.2 Configuring the Slave for the Master

The config bytes define the type and number of cyclically transmitted input/output bytes. The selection of configurations can be taken from the GSD.

At least 3 config bytes have to be sent:

- 1st Config Byte:
  0x00: Only processing of process data (AKZ and PNU not used)
  0xF3: 8 byte input/output -> full functions of all writable/readable variables
- 2nd/ 3rd Config Byte:
  each 0x00 or 0x50 to 0x5F: define the total number of cyclically readable process data
- 4th Config Byte (optional):
  0x00: Use of the Simatic S5 floating-point format (otherwise IEEE)

From software version -C4 onwards additional process data can be transmitted by adding up to 8 config bytes containing 0xA2 (otherwise only via job identification (AKZ) and parameter number (PNU)).

3.2.3 Parameterization of the Slave for the Master

The additional parameterization defines which process data (each 2 bytes) are transmitted cyclically in which order.

Each process variable is defined (addressed) by 2 parameter bytes.

Parameter bytes 1 to 64 set the up to 32 readable process values.

Expansion from software version -C4 onwards:

- Parameter bytes 65 to -80 set the up to 8 writable process values,
- A further byte can be added (content 0x01) for using a special time monitoring function (see there) resulting in an uneven number of parameter bytes.

3.2.4 Time Monitoring

The master can set parameters for a DP watchdog time. It becomes active when monitoring time parameters are set in the SIPART DR. This time must be < 10 sec. The device reaction when there is a time out (sum of DP watchdog and device monitoring time) then corresponds with the respective device configuration.

If the SIPART is also to react correspondingly to the "Master only transmits zeros" (e.g. PLC in stop), an uneven last parameter byte 0x01 must also be sent (software version -C4 onwards).

3.3 Transmission Procedure with job identification (AKZ) and parameter number (PNU)

1. Config-Byte=0xF3

The 8 byte input/output (each consistent across all 8 bytes) is used in the following way for reading and writing with AKZ (job identification) and PNU (parameter number):

	Master -> Slave (command)		Slave -> Master (reply)	
1. Byte	AKZ	PNU	AKZ	PNU
2. Byte	PNU		PNU	
3. Byte	Subindex (if required)		Subindex (if required)	
4. Byte	0		0	
5. Byte	Data 1 (only double word)		Data 1 (only double word)	
6. Byte	Data 2 (only double word)		Data 2 (only double word)	
7. Byte	Data 3		Data 3	
8. Byte	Data 4		Data 4	

Meaning of AKZ
0: No job
1: Read parameter
2: Write parameter (word)
3: Write parameter (double word)
4: Description element
Read with subindex 1 - 6
6: Read parameter (element of an arrays)
7: Write parameter
(element of an array)

Note:
Software version -C4 onwards
No decision
Between AKZ 2 and 3

Meaning of AKZ
0: No reply
1: Requested data in data 3 - 4
2: Requested data in data 1 - 4
3: Requested description element in data 1 - 4
4: Requested array element in data 1 - 4
8: No operating hierarchy
(e.g. parameterization on device front)
7: Job cannot be carried out
Data 4 then contains the following error no.:
0: Invalid parameter number (PNU)
1: Parameter not writable
2: Value range invalid
3: Incorrect subindex
4: No array
5: Incorrect data type
11: No access achieved via ST_U
18: Other error (process data buffer full)

3.4 Description of the Communication Objects

Each communication object has a parameter number (PNU) and a parameter description in the form of a data record. This description can be read out using job identification (AKZ) 4 and the subindex.

Subindex	Byte-length	Meaning	Data type
1	2	Identification/data type	octet string
2	1	Number of array elements for parameter	unsigned char
3	4	Lower limit value	as selected PNU
4	4	Upper limit value	Parameter (Doppelwort) schreiben
5	2	Variable index/conversion index	octet string
6	4	Name	ASCII string

PNU = Parameter number

3.4.1 Interpretation of Identification

(byte 1/subindex 1)

Bit	Meaning
7	PNU as process data (PCD) suitable for cyclic reading (writing)
6	PNU is an array (a sequence of data from the same type)
5	Writable only with PNU 0 = 2/3 (bit 1 in status ST_U)
4	Writable only with PNU 0 = 1/3 (bit 0 in status ST_U)
3	-
2	Special formats (”off” / ”auto” / ”nop”) permitted
1	Not writable
0	Limit values not relevant

PNU = Parameter number

3.4.2 Interpretation of Data Type

(byte 2/subindex 1)

Nro.	Byte length	Abbreviation	Format	Comments
3	2	int16	integer 16	
4	4	int32	integer 32	
8	4	FL	float IEEE	
10	2	os	octet string	
14	2	bs	bit string	
9	4	vs	ASCII string	
24	4	FL	float Simatic-S5 format	Only when 4th config byte = 0

Note:
1.) Order of bytes always from high to low
2). The two low mantissa bytes should be 0 when float values are written

Special formats (if permitted)
”oFF” with float values: 0x00000000
”oFF” / ”auto” / ”nop” with int16 values: 0x8000

3.4.3 Interpretation of Variable Index

(byte 1/subindex 5)

According to actuator-sensor profile of PNO.

Examples:

No.	Meaning	Unit
4	Time	
17	Temperature	Degree
23	Resistance	Ohms

3.4.4 Interpretation of Conversion Index

(byte 2/subindex 5)

This value contains the 10th power with which the transmitted value has to be multiplied.

e.g.:
Transmitted PNU value: 0x0064 (int16 --> 100)
Conversion index: 0XFF (-1 in 2 complement)

:--> valid value: 100 * 10Exp-1 = 10

Special cases:

- 0x7F (127) : Conversion factor: * 1/16384
  Example:
  int16 0x2000 = 8192 --> 8192 * 1/16384 = 0.5 = 50%

- 0xE9 (-23): Conversion factor: * 20 (msec)

3.5 Universal Communication Objects

The following objects (PNU < 100) are the same for all SIPART DR. The device-specific objects are listed from PNU 100 onwards.

PNU (dec.)	Description element (subindex)						
	1 Identification/data type	2 Array number	3 Min. value	4 Max. value	5 Variable index/conversion index	6 Name	
0	00000000 / bs16	0	0	3	0 / 0	ST_U	1.)
1	00000011 / int16	0	0	0	0 / 0	MAX	2.)
2	10000001 / bs16	0	0	0	0 / 0	ST_C	3.)
3	00000011 / os2	0	0	0	0 / 0	Typ	4.)
4	00000011 / os2	0	0	0	0 / 0	V_Gr	5.)
5	00000011 / os2	0	0	0	0 / 0	V_Op	6.)
6 bis 9	00000001 / vs4	0	0	0	0 / 0	KNZ1 to KNZ4	7.)
10 bis 41	00000001 / int 16	0	0	0	0 / 0	PZ01 to PZ32	8.)
42 bis 49	00000001 / int 16	0	0	0	0 / 0	PZW1 to PZW8	9.)

PNU = Parameter number; PZ = Process value; PZW = Process value writable

1.) Control byte for parameterization/structuring (writable/readable)

Method for writing ”onPA” parameters
- Filling bit 1 of the PNU 0 with 1
- Writing any parameters with bit 5 identifier possible in corresponding identification
- Filling bit 1 of the PNU 0 with 0 (-> data are transferred into device)

Method for writing ”stru” parameters
- Filling bit 0 of the PNU 0 with 1
- Writing any parameters with bit 5 identifier possible in corresponding identification
- Filling bit 0 of the PNU 0 with 0 (-> data are transferred into device)

Note: Bit 0 and bit 1 can also be changed in a common write job.

2.) Highest PNU (only readable)

3.) Status C (writable/readable)

Bit	Meaning
4	Front parameterization enabled
3	Front structuring enabled
2	Write protection for job to be carried out available
1	Front access to ”onPA” parameter with identifier bit 5 in identification has occurred (not with DR20!)
0	Front access to ”Stru” parameter with identifier bit 4 in identification has occurred (not with DR20!)

Note: Identifiers in bit 0 / .1 / .2 can be acknowledged by filling with 0

4.) Device type (only readable):
= 0: SIPART DR20
= 1: SIPART DR22
= 2: SIPART DR24
= 3: SIPART DR21
= 4: SIPART DR19
= 5: SIPART DR19P (with time scheduler)

5.) Software version SIPART DR basic unit (only readable)

6.) Software version PROFIBUS module (only readable)

7.) The system identifier consisting of 4*4 byte ASCII is writable/readable. The data are saved on the module with no-volt protection.

8./9.) The PNUs 10 to 41 or 42 to 49 are a replica of the extended parameters for setting the read/write data in the cyclic data transfer. They only have to be filled when the master does not have extended parameter capability.
The data are then saved on the module with no-volt protection.

3.6 Writing Process Data (Cyclic)

This function is only possible with software version -C4 onwards.

These data must be written using AKZ and PNU in earlier versions.

Each config byte from the 0xA2 form creates 3 byte output with consistency over all 3 bytes. This allows one process variable for each to be written.

The PNU number of the variable to be written must be set in the extended parameters from byte no. 65.

	Master --> Slave
1.Byte	High byte process date
2.Byte	Low byte process date
3.Byte	Status: 0x80 -> sent data valid / otherwise invalid

3.7 Examples

Using job identification (AKZ) and parameter number (PNU) (1. Config Byte = 0xF3)

1.) Reading DR2210 PNU 100 [0x64]
(Device value: Parameter tFI = 3.000)

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	1	0	2	0
2.Byte	0x64		0x64	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0x40	
6.Byte	0		0x40	
7.Byte	0		0x00	
8.Byte	0		0x00	

2.) Reading DR2210 PNU 260 [0x104]
(Device value: structure switch S38 = 1)

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	1	1	1	1
2.Byte	0x04		0x04	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0	
8.Byte	0		0x01	

3.) Reading DR2210 PNU 520 [0x208] (if not via cyclical process data)
(device value: AA5 = 0,75 = 75 %)

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	1	2	1	2
2.Byte	0x08		0x08	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0x30	
8.Byte	0		0x00	

4.) Reading DR2210 PNU 109 [0x6D] / description element 1
(reply according to device specific paramater tables)

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	4	0	3	0
2.Byte	0x6D		0x6D	
3.Byte	1		1	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0x24	
8.Byte	0		0x08	

5.) Reading DR2210 PNU 380 [0x17C] / array element 2
(device value: FdeF Ar2=YES)

	Master->Slave (command)		Slave->Master (reply)	
1.Byte	6	1	4	1
2.Byte	0x7C		0x7C	
3.Byte	2		2	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0	
8.Byte	0		0x80	

6.) Writing ”onpa” parameter VV1 = 2500 PNU 101 [0x65] and c7 = 10.00 PNU 399 [0x18F]

6.1.) Writing ST_U Bit.1 = 1 -> writing of ”onpa” parameters possible

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	0	1	0
2.Byte	0x00		0x00	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0	
8.Byte	0x02		0x02	

6.2.) Writing 1st parameter

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	3	0	1	0
2.Byte	0x65		0x65	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0x40		0x40	
6.Byte	0x20		0x20	
7.Byte	0x00		0x00	
8.Byte	0x00		0x00	

6.3.) Writing 2nd parameter

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	1	1	1
2.Byte	0x8F		0x8F	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0x03		0x03	
8.Byte	0xE8		0xE8	

6.4.) Writing ST_U Bit.1 = 0

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	0	1	0
2.Byte	0		0	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0	
8.Byte	0x00		0x00	

Note:
as of software version -C4 of the modules and -C7 of the controller DR2210 it is possible to write single parameters without controlling with ST_U.

7.) Writing "stru" parameter YS = 25 % PNU 162 [0xA2] and S266 = 10 PNU 497 [0x1F1]

7.1.) Writing ST_U Bit.0 = 1 -> Writing of "stru" parameters possible

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	0	1	0
2.Byte	0x00		0x00	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0		0	
8.Byte	0x01		0x01	

7.2.) Writing 1. Parameter

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	0	1	0
2.Byte	0xA2		0xA2	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0x10		0x10	
8.Byte	0x00		0x00	

7.3.) Writing 2. Parameter

	Master -> Slave (command)			Slave -> Master (reply)	
1.Byte	2	1		1	1
2.Byte	0xF1			0xF1	
3.Byte	0			0	
4.Byte	0			0	
5.Byte	0			0	
6.Byte	0			0	
7.Byte	0			0	
8.Byte	0x0A			0x0A	

7.4.) Writing ST_U Bit.0 = 0

	Master -> Slave (command)			Slave -> Master (reply)	
1.Byte	2	0		1	0
2.Byte	0			0	
3.Byte	0			0	
4.Byte	0			0	
5.Byte	0			0	
6.Byte	0			0	
7.Byte	0			0	
8.Byte	0x00			0x00	

8.) Reading DR2210 process variables x_1 PNU 341 [0x155] via AKZ and PNU (device value for x = 35 %)

	Master -> Slave (command)			Slave -> Master (reply)	
1.Byte	1	1		1	1
2.Byte	0x55			0x55	
3.Byte	0			0	
4.Byte	0			0	
5.Byte	0			0	
6.Byte	0			0	
7.Byte	0			0x16	
8.Byte	0x00			0x66	

9.) Writing DR2210 process variables YH_2 PNU 527 [0x20F] via AKZ and PNU (transmitted value = 11%)

	Master -> Slave (command)		Slave -> Master (reply)	
1.Byte	2	2	1	2
2.Byte	0x0F		0x0F	
3.Byte	0		0	
4.Byte	0		0	
5.Byte	0		0	
6.Byte	0		0	
7.Byte	0x07		0x07	
8.Byte	0x0A		0x0A	

10.) Reading cyclical of DR2210 of 4 process values in the following sequence:

Actual value 1 (x_1)	PNU 341	[0x155]	value: 80 %
Setpoint (w_2)	PNU 349	[0x15D]	value: 30 %
Analog input 1 (AE1)	PNU 363	[0x16B]	value: -1 %
Analog output 9 (AA9)	PNU 524	[0x20C]	value: 10 %

Config bytes: 0xF3 / 0x53 (for 4 (process data (PZD)) / 0x00

Extended parameterization (8 additional user parameters):
(or writing once of the parameter numbers (PNU) 10 - 17)

1.Param.	0x01
2.Param.	0x55
3.Param.	0x01
4.Param.	0x5D
5.Param.	0x01
6.Param.	0x6B
7.Param.	0x02
8.Param.	0x0C

	Slave -> Master (reply)		
1.Byte	x	x	
2.Byte	x		
3.Byte	x		
4.Byte	x		
5.Byte	x		
6.Byte	x		
7.Byte	x		
8.Byte	x		
9.Byte	0x33		80 %
10.Byte	0x33		
11.Byte	0x13		30 %
12.Byte	0x33		
13.Byte	0xFF		-1 %
14.Byte	0x5C		
15.Byte	0x06		10 %
16.Byte	0x66		

Note:
the first 8 byte contain the reaction of a master request.
If the 1st Config byte is = 0x00 these 8 byte will be cancelled.

11.) Writing cyclical of DR2210 of 4 process values in the following sequence:

Status Stes	PNU	373	[0x0175]	value: 0x80
Setpoint 1 (w1es)	PNU	377	[0x0179]	value: 40 %
Manual variable 1 (YH1)	PNU	379	[0x017B]	value: 20%
Manual variable 2 (YH2)	PNU	527	[0x020F]	value: (don't care)

Config bytes: 0xF3 / 0x55 (for e.g. 6 PZDs) / 0x00 / 0xA2 / 0xA2 / 0xA2 / 0xA2

Extended parameterization (72 additional user parameters):
(or writing once of the parameter numbers (PNU) 43 - 47)

65.Param 0x01
66.Param 0x75
67.Param 0x01
68.Param 0x79
69.Param 0x01
70.Param 0x7B
71.Param 0x02
72.Param 0x0F

	Master -> Slave		
1.Byte	x	x	
2.Byte	x		
3.Byte	x		
4.Byte	x		
5.Byte	x		
6.Byte	x		
7.Byte	x		
8.Byte	x		
9.Byte	0x00		
10.Byte	0x80		value: 0x80
11.Byte	0x80		status: valid
12.Byte	0x19		
13.Byte	0x99		value: 40 %
14.Byte	0x80		status: valid
15.Byte	0x0C		
16.Byte	0xCC		value: 20 %
17.Byte	0x80		status: valid
18.Byte	x		
19.Byte	x		
20.Byte	0x00		status: invalid

3.8 Table of the DP communication objects

Parameter "onPA"

PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
0000	76543210/						
100	00100100/ Fl	0	1.000	1000	4 / 0	"tF_1"	** oFF
101	00100000/ Fl	0	0.100	10.00	0 / 0	"vv_1"	
102	00100000/ Fl	0	0.100	100.0	0 / 0	"cP_1"	
103	00100000/ Fl	0	1.000	9984	4 / 0	"tn_1"	
104	00100100/ Fl	0	1.000	2992	4 / 0	"tv_1"	** oFF
105	00100000/int16	0	0.0	10.0	0 /7FH	"AH_1"	
106	00100100/int16	0	0.0	100.0	0 /7FH	"Y0_1"	** Auto
107	00100000/int16	0	-10.0	110.0	0 / 7FH	"YA_1"	
108	00100000/int16	0	-10.0	110.0	0 / 7FH	"YE_1"	
109	00100100/ Fl	0	1.000	1000	4 / 0	"tF_2"	** oFF
110	00100000/ Fl	0	0.100	10.00	0 / 0	"vv_2"	
111	00100000/ Fl	0	0.100	100.0	0 / 0	"cP_2"	
112	00100000/ Fl	0	1.000	9984	4 / 0	"tn_2"	
113	00100100/ Fl	0	1.000	2992	4 / 0	"tv_2"	** oFF
114	00100000/int16	0	0.0	10.0	0 /7FH	"AH_2"	
115	00100100/int16	0	0.0	100.0	0 /7FH	"Y0_2"	** Auto
116	00100000/int16	0	-10.0	110.0	0 / 7FH	"YA_2"	
117	00100000/int16	0	-10.0	110.0	0 / 7FH	"YE_2"	
118	00100000/int16	0	1	100	4 / -1	"dr "	
119	00100100/Fl	0	1	1000	4 / 0	"tY "	** off
120	00100000/int16	0	1	30	4 /-23	"tA "	
121	00100000/int16	0	1	30	4 /-23	"tE "	
122	00100100/ Fl	0	0.100	1000	4 / 0	"tF1 "	** oFF

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
123	00100100/ Fl	0	0.100	1000	4 / 0	”tF2 ”	** oFF
124	00100100/ Fl	0	0.100	1000	4 / 0	”tF3 ”	** oFF
125	00100100/ Fl	0	0.100	1000	4 / 0	”tF4 ”	** oFF
126	00100100/ Fl	0	0.100	1000	4 / 0	”tF5 ”	** oFF
127	00100000/int16	0	-1999	19999	0 / -3	”c1 ”	
128	00100000/int16	0	-1999	19999	0 / -3	”c2 ”	
129	00100000/int16	0	-1999	19999	0 / -3	”c3 ”	
130	00100000/int16	0	-1999	19999	0 / -3	”c4 ”	
131	00100000/int16	0	-1999	19999	0 / -3	”c5 ”	
132	00100000/int16	0	-1999	1999	0 / -2	”c6 ”	
133	00100000/int16	0	-1999	19999	0 / -3	”P01 ”	
134	00100000/int16	0	-1999	19999	0 / -3	”P02 ”	
135	00100000/int16	0	-1999	19999	0 / -3	”P03 ”	
136	00100000/int16	0	-1999	19999	0 / -3	”P04 ”	
137	00100000/int16	0	-1999	19999	0 / -3	”P05 ”	
138	00100000/int16	0	-1999	19999	0 / -3	”P06 ”	
139	00100000/int16	0	-1999	19999	0 / -3	”P07 ”	
140	00100000/int16	0	-1999	19999	0 / -3	”P08 ”	
141	00100000/int16	0	-1999	19999	0 / -3	”P09 ”	
142	00100000/int16	0	-1999	19999	0 / -3	”P10 ”	
385	00100000/int16	0	-1999	19999	0 / -3	”P11 ”	
386	00100000/int16	0	-1999	19999	0 / -3	”P12 ”	
387	00100000/int16	0	-1999	19999	0 / -3	”P13 ”	
388	00100000/int16	0	-1999	19999	0 / -3	”P14 ”	
389	00100000/int16	0	-1999	19999	0 / -3	”P15 ”	
390	00100000/ Fl	0	1	1000	4 / 0	”ty2 ”	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
391	00100000/int16	0	1	30	4 /-23	"ta2 "	
392	00100000/int16	0	1	30	4 /-23	"te2 "	
393	00100100/ Fl	0	0.100	1000	4 / 0	"tf6 "	off
394	00100100/ Fl	0	0.100	1000	4 / 0	"tf7 "	off
395	00100100/ Fl	0	0.100	1000	4 / 0	"tf8 "	off
396	00100100/ Fl	0	0.100	1000	4 / 0	"tf9 "	off
397	00100100/ Fl	0	0.100	1000	4 / 0	"tf10"	off
398	00100100/ Fl	0	0.100	1000	4 / 0	"tf11"	off
399	00100000/int16	0	-1999	1999	0 / -2	"c7 "	
400	00100000/int16	0	-1999	19999	0 / -3	"c8 "	
401	00100000/int16	0	-1999	19999	0 / -3	"c9 "	
402	----------	-	------	------	------	----	no access
403	----------	-	------	-----	------	----	no access

Parameter "oFPA"

143	00010000/int16	0	0	3	0 / 0	"dP1 "	
144	00010000/int16	0	-1999	19999	0 / 0	"dA1 "	
145	00010000/int16	0	-1999	19999	0 / 0	"dE1 "	
146	00010000/int16	0	0	3	0 / 0	"dP2 "	
147	00010000/int16	0	-1999	19999	0 / 0	"dA2 "	
148	00010000/int16	0	-1999	19999	0 / 0	"dE2 "	
149	00010000/int16	0	-110.0	110.0	0 /7FH	"A1 "	
150	00010000/int16	0	-110.0	110.0	0 /7FH	"A2 "	
151	00010000/int16	0	-110.0	110.0	0 /7FH	"A3 "	
152	00010000/int16	0	-110.0	110.0	0 /7FH	"A4 "	
153	00010000/int16	0	0.1	20.0	0 /7FH	"H1.2"	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
154	00010000/int16	0	0.1	20.0	0 /7FH	”H3.4”	
155	00010000/int16	0	-10.0	110.0	0 /7FH	”SA ”	
156	00010000/int16	0	-10.0	110.0	0 /7FH	”SE ”	
157	00010000/int16	0	-10.0	110.0	0 /7FH	”SH ”	
158	00010000/int16	0	-10.0	110.0	0 /7FH	”Sb ”	
159	00010100/ Fl	0	0.100	9984	4 / 70	”tS ”	** oFF
160	00010000/int16	0	0	19999	0 / -3	”vA ”	
161	00010000/int16	0	0	19999	0 / -3	”vE ”	
162	00010000/int16	0	-10.0	110.0	0 /7FH	”YS ”	
163	00010000/int16	0	0.0	100.0	0 /7FH	”Y1 ”	
164	00010000/int16	0	0.0	100.0	0 /7FH	”Y2 ”	
165	00010000/int16	0	-199.9	199.9	0 /7FH	”-1.1”	
166	00010000/int16	0	-199.9	199.9	0 /7FH	” 0.1”	
167	00010000/int16	0	-199.9	199.9	0 /7FH	” 1.1”	
168	00010000/int16	0	-199.9	199.9	0 /7FH	” 2.1”	
169	00010000/int16	0	-199.9	199.9	0 /7FH	” 3.1”	
170	00010000/int16	0	-199.9	199.9	0 /7FH	” 4.1”	
171	00010000/int16	0	-199.9	199.9	0 /7FH	” 5.1”	
172	00010000/int16	0	-199.9	199.9	0 /7FH	” 6.1”	
173	00010000/int16	0	-199.9	199.9	0 /7FH	” 7.1”	
174	00010000/int16	0	-199.9	199.9	0 /7FH	” 8.1”	
175	00010000/int16	0	-199.9	199.9	0 /7FH	” 9.1”	
176	00010000/int16	0	-199.9	199.9	0 /7FH	”10.1”	
177	00010000/int16	0	-199.9	199.9	0 /7FH	”11.1”	
178	00010000/int16	0	-199.9	199.9	0 /7FH	”-1.3”	
179	00010000/int16	0	-199.9	199.9	0 /7FH	” 0.3”	
180	00010000/int16	0	-199.9	199.9	0 /7FH	” 1.3”	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
181	00010000/int16	0	-199.9	199.9	0 /7FH	” 2.3”	
182	00010000/int16	0	-199.9	199.9	0 /7FH	” 3.3”	
183	00010000/int16	0	-199.9	199.9	0 /7FH	” 4.3”	
184	00010000/int16	0	-199.9	199.9	0 /7FH	” 5.3”	
185	00010000/int16	0	-199.9	199.9	0 /7FH	” 6.3”	
186	00010000/int16	0	-199.9	199.9	0 /7FH	” 7.3”	
187	00010000/int16	0	-199.9	199.9	0 /7FH	” 8.3”	
188	00010000/int16	0	-199.9	199.9	0 /7FH	” 9.3”	
189	00010000/int16	0	-199.9	199.9	0 /7FH	”10.3”	
190	00010000/int16	0	-199.9	199.9	0 /7FH	”11.3”	
191	00010000/int32	0	10	1000	0 /-3	”PA ”	
192	00010000/int32	0	1000	99990	0 /-3	”PE ”	
193	00010000/int32	0	10	1000	0 /-3	”T_A ”	
194	00010000/int32	0	1000	99990	0 /-3	”T_E ”	
404	00010000/int16	0	-10.0	110.0	0 /7FH	”SA2 ”	
405	00010000/int16	0	-10.0	110.0	0 /7FH	”SE2 ”	
406	00010100/Fl	0	0.100	9984	4 / 70	”tS2 ”	** off
407	00010000/int16	0	-10.0	110.0	0 /7FH	”YS2 ”	
408	00010000/int16	0	0	3	0 / 0	”Pd ”	
409	00010000/int16	0	-1999	19999	0 / 0	”Ad ”	
410	00010000/int16	0	-1999	19999	0 / 0	”Ed ”	
411	00010000/int16	0	0.1	20.0	0 / 7FH	”H2 ”	
412	00010000/int16	0	0.1	20.0	0 / 7FH	”H4 ”	
413	00010000/int16	0	0.0	100.0	0 / 7FH	”Y3 ”	
414	00010000/int16	0	0.0	100.0	0 / 7FH	”Y4 ”	

Parameter "PASt"

PNU (dez)	Description element (subindex) Identification/datatype	Array numb.	min value	max value	variabl/convers.index	Name	Note
195	00010000/ Fl	0	0.100	10.00	0 / 0	"vvc "	
196	00010000/ Fl	0	0.100	100.0	0 / 0	"cP1 "	
197	00010000/ Fl	0	0.100	100.0	0 / 0	"cP3 "	
198	00010000/ Fl	0	0.100	100.0	0 / 0	"cP5 "	
199	00010000/ Fl	0	0.100	100.0	0 / 0	"cP7 "	
200	00010000/ Fl	0	0.100	100.0	0 / 0	"cP9 "	
201	00010000/ Fl	0	1.000	9984	4 / 0	"tn1 "	
202	00010000/ Fl	0	1.000	9984	4 / 0	"tn3 "	
203	00010000/ Fl	0	1.000	9984	4 / 0	"tn5 "	
204	00010000/ Fl	0	1.000	9984	4 / 0	"tn7 "	
205	00010000/ Fl	0	1.000	9984	4 / 0	"tn9 "	
206	00010100/ Fl	0	1.000	2992	4 / 0	"tv1 "	oFF
207	00010100/ Fl	0	1.000	2992	4 / 0	"tv3 "	oFF
208	00010100/ Fl	0	1.000	2992	4 / 0	"tv5 "	oFF
209	00010100/ Fl	0	1.000	2992	4 / 0	"tv7 "	oFF
210	00010100/ Fl	0	1.000	2992	4 / 0	"tv9 "	oFF
211	00010000/int16	0	0.0	10.0	0 /7FH	"AH1 "	
212	00010000/int16	0	0.0	10.0	0 /7FH	"AH3 "	
213	00010000/int16	0	0.0	10.0	0 /7FH	"AH5 "	
214	00010000/int16	0	0.0	10.0	0 /7FH	"AH7 "	
215	00010000/int16	0	0.0	10.0	0 /7FH	"AH9 "	
216	00010100/int16	0	0.0	100.0	0 /7FH	"Y01 "	** Auto
217	00010100/int16	0	0.0	100.0	0 /7FH	"Y03 "	** Auto
218	00010100/int16	0	0.0	100.0	0 /7FH	"Y05 "	** Auto
219	00010100/int16	0	0.0	100.0	0 /7FH	"Y07 "	** Auto
220	00010100/int16	0	0.0	100.0	0 /7FH	"Y09 "	** Auto

Parameter "CAE4/CAE5"

PNU (dez)	Description element (subindex) Identification/datatype	Array numb.	min value	max value	variabl/convers. index	Name	Note
415	00010000/int16	0	0	7	0 / 0	"Sen4"	
416	00010000/int16	0	0	2	0 / 0	"uni4"	
417	00010000/int16	0	0	10	0 / 0	"typ4"	
418	00010000/int16	0	0	10000	23 / -2	"Mr4 "	
419	00010000/int16	0	0	4000	17 / -1	"tb4 "	
420	00010000/int16	0	0	3	0 / 0	"MP4 "	
421	00010000/int16	0	-1999	19999	0 / 0	"MA4 "	
422	00010000/int16	0	-1999	19999	0 / 0	"ME4 "	
423	00010000/int16	0	0	7	0 / 0	"Sen5"	
424	00010000/int16	0	0	2	0 / 0	"uni5"	
425	00010000/int16	0	0	10	0 / 0	"typ5"	
426	00010000/int16	0	0	10000	23 / -2	"Mr5 "	
427	00010000/int16	0	0	4000	17 / -1	"tb5 "	
428	00010000/int16	0	0	3	0 / 0	"MP5 "	
429	00010000/int16	0	-1999	19999	0 / 0	"MA5 "	
430	00010000/int16	0	-1999	19999	0 / 0	"ME5 "	

Structure switches "StrS"

221	00010000/int16	0	0	254	0 / 0	"S0 "	
222	00010000/int16	0	0	12	0 / 0	"S1 "	
223	00010000/int16	0	0	2	0 / 0	"S2 "	
224	00010000/int16	0	0	1	0 / 0	"S3 "	
225	00010000/int16	0	0	1	0 / 0	"S4 "	
226	00010000/int16	0	0	3	0 / 0	"S5 "	
227	00010000/int16	0	0	3	0 / 0	"S6 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
228	00010000/int16	0	0	3	0 / 0	"S7 "	
229	00010000/int16	0	0	7	0 / 0	"S8 "	
230	00010000/int16	0	0	7	0 / 0	"S9 "	
231	00010000/int16	0	0	1	0 / 0	"S10 "	
232	00010000/int16	0	0	1	0 / 0	"S11 "	
233	00010000/int16	0	0	1	0 / 0	"S12 "	
234	00010000/int16	0	0	1	0 / 0	"S13 "	
235	00010000/int16	0	0	1	0 / 0	"S14 "	
236	00010000/int16	0	0	11	0 / 0	"S15 "	
237	00010000/int16	0	0	11	0 / 0	"S16 "	
238	00010000/int16	0	0	11	0 / 0	"S17 "	
239	00010000/int16	0	0	11	0 / 0	"S18 "	
240	00010000/int16	0	0	11	0 / 0	"S19 "	
241	00010000/int16	0	0	1	0 / 0	"S20 "	
242	00010000/int16	0	0	1	0 / 0	"S21 "	
243	00010000/int16	0	0	6	0 / 0	"S22 "	
244	00010000/int16	0	0	6	0 / 0	"S23 "	
245	00010000/int16	0	-1	18	0 / 0	"S24 "	
246	00010000/int16	0	0	18	0 / 0	"S25 "	
247	00010000/int16	0	0	18	0 / 0	"S26 "	
248	00010000/int16	0	0	18	0 / 0	"S27 "	
249	00010000/int16	0	0	18	0 / 0	"S28 "	
250	00010000/int16	0	0	18	0 / 0	"S29 "	
251	00010000/int16	0	0	18	0 / 0	"S30 "	
252	00010000/int16	0	0	18	0 / 0	"S31 "	
253	00010000/int16	0	0	18	0 / 0	"S32 "	
254	00010000/int16	0	0	18	0 / 0	"S33 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
255	00010000/int16	0	0	18	0 / 0	"S34 "	
256	00010000/int16	0	0	18	0 / 0	"S35 "	
257	00010000/int16	0	0	18	0 / 0	"S36 "	
258	00010000/int16	0	0	18	0 / 0	"S37 "	
259	00010000/int16	0	0	18	0 / 0	"S38 "	
260	00010000/int16	0	0	1	0 / 0	"S39 "	
261	00010000/int16	0	0	1	0 / 0	"S40 "	
262	00010000/int16	0	0	1	0 / 0	"S41 "	
263	00010000/int16	0	0	1	0 / 0	"S42 "	
264	00010000/int16	0	0	1	0 / 0	"S43 "	
265	00010000/int16	0	0	1	0 / 0	"S44 "	
266	00010000/int16	0	0	1	0 / 0	"S45 "	
267	00010000/int16	0	0	1	0 / 0	"S46 "	
268	00010000/int16	0	0	2	0 / 0	"S47 "	
269	00010000/int16	0	0	1	0 / 0	"S48 "	
270	00010000/int16	0	0	2	0 / 0	"S49 "	
271	00010000/int16	0	0	1	0 / 0	"S50 "	
272	00010000/int16	0	0	1	0 / 0	"S51 "	
273	00010000/int16	0	0	1	0 / 0	"S52 "	
274	00010000/int16	0	0	1	0 / 0	"S53 "	
275	00010000/int16	0	0	1	0 / 0	"S54 "	
276	00010000/int16	0	0	3	0 / 0	"S55 "	
277	00010000/int16	0	0	1	0 / 0	"S56 "	
278	00010000/int16	0	0	3	0 / 0	"S57 "	
279	00010000/int16	0	0	2	0 / 0	"S58 "	
280	00010000/int16	0	0	2	0 / 0	"S59 "	
281	00010000/int16	0	0	30	0 / 0	"S60 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
282	00010000/int16	0	0	1	0 / 0	"S61 "	
283	00010000/int16	0	0	1	0 / 0	"S62 "	
284	00010000/int16	0	0	2	0 / 0	"S63 "	
285	00010000/int16	0	0	4	0 / 0	"S64 "	
286	00010000/int16	0	0	1	0 / 0	"S65 "	
287	00010000/int16	0	0	1	0 / 0	"S66 "	
288	00010000/int16	0	0	3	0 / 0	"S67 "	
289	00010000/int16	0	0	1	0 / 0	"S68 "	
290	00010000/int16	0	0	1	0 / 0	"S69 "	
291	00010000/int16	0	0	1	0 / 0	"S70 "	
292	00010000/int16	0	0	1	0 / 0	"S71 "	
293	00010000/int16	0	0	1	0 / 0	"S72 "	
294	00010000/int16	0	0	41	0 / 0	"S73 "	
295	00010000/int16	0	0	41	0 / 0	"S74 "	
296	00010000/int16	0	0	41	0 / 0	"S75 "	
297	00010000/int16	0	0	16	0 / 0	"S76 "	
298	00010000/int16	0	0	16	0 / 0	"S77 "	
299	00010000/int16	0	0	16	0 / 0	"S78 "	
300	00010000/int16	0	0	16	0 / 0	"S79 "	
301	00010000/int16	0	0	16	0 / 0	"S80 "	
302	00010000/int16	0	0	16	0 / 0	"S81 "	
303	00010000/int16	0	0	16	0 / 0	"S82 "	
304	00010000/int16	0	0	16	0 / 0	"S83 "	
305	00010000/int16	0	0	16	0 / 0	"S84 "	
306	00010000/int16	0	0	16	0 / 0	"S85 "	
307	00010000/int16	0	0	1	0 / 0	"S86 "	
308	00010000/int16	0	0	1	0 / 0	"S87 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
309	00010000/int16	0	0	1	0 / 0	"S88 "	
310	00010000/int16	0	0	1	0 / 0	"S89 "	
311	00010000/int16	0	0	1	0 / 0	"S90 "	
312	00010000/int16	0	0	1	0 / 0	"S91 "	
313	00010000/int16	0	0	1	0 / 0	"S92 "	
314	00010000/int16	0	0	1	0 / 0	"S93 "	
315	00010000/int16	0	0	39	0 / 0	"S94 "	
316	00010000/int16	0	0	39	0 / 0	"S95 "	
317	00010000/int16	0	0	3	0 / 0	"S96 "	
318	00010000/int16	0	0	3	0 / 0	"S97 "	
319	00010000/int16	0	0	2	0 / 0	"S98 "	
320	00010000/int16	0	0	1	0 / 0	"S99 "	
321	00010000/int16	0	0	1	0 / 0	"S100"	
322	00010010/int16	0	0	5	0 / 0	"S101"	
323	00010010/int16	0	0	5	0 / 0	"S102"	
324	00010010/int16	0	0	1	0 / 0	"S103"	
325	00010010/int16	0	0	2	0 / 0	"S104"	
326	00010010/int16	0	0	1	0 / 0	"S105"	
327	00010010/int16	0	0	125	0 / 0	"S106"	
328	00010010/int16	0	0	25	0 / 0	"S107"	
431	00010000/int16	0	0	3	0 / 0	"S200"	
432	00010000/int16	0	0	3	0 / 0	"S201"	
433	00010000/int16	0	0	3	0 / 0	"S202"	
434	00010000/int16	0	0	3	0 / 0	"S203"	
435	00010000/int16	0	0	3	0 / 0	"S204"	
436	00010000/int16	0	0	3	0 / 0	"S205"	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
437	00010000/int16	0	0	1	0 / 0	"S206"	
438	00010000/int16	0	0	1	0 / 0	"S207"	
439	00010000/int16	0	0	1	0 / 0	"S208"	
440	00010000/int16	0	0	1	0 / 0	"S209"	
441	00010000/int16	0	0	1	0 / 0	"S210"	
442	00010000/int16	0	0	1	0 / 0	"S211"	
443	00010000/int16	0	0	11	0 / 0	"S212"	
444	00010000/int16	0	0	11	0 / 0	"S213"	
445	00010000/int16	0	0	11	0 / 0	"S214"	
446	00010000/int16	0	0	11	0 / 0	"S215"	
447	00010000/int16	0	0	11	0 / 0	"S216"	
448	00010000/int16	0	0	11	0 / 0	"S217"	
449	00010000/int16	0	0	18	0 / 0	"S218"	
450	00010000/int16	0	-1	18	0 / 0	"S219"	
451	00010000/int16	0	0	18	0 / 0	"S220"	
452	00010000/int16	0	0	18	0 / 0	"S221"	
453	00010000/int16	0	0	18	0 / 0	"S222"	
454	00010000/int16	0	0	18	0 / 0	"S223"	
455	00010000/int16	0	0	18	0 / 0	"S224"	
456	00010000/int16	0	-1	18	0 / 0	"S225"	
457	00010000/int16	0	-1	18	0 / 0	"S226"	
458	00010000/int16	0	0	18	0 / 0	"S227"	
459	00010000/int16	0	0	18	0 / 0	"S228"	
460	00010000/int16	0	0	1	0 / 0	"S229"	
461	00010000/int16	0	0	1	0 / 0	"S230"	
462	00010000/int16	0	0	2	0 / 0	"S231"	
463	00010000/int16	0	0	2	0 / 0	"S232"	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
464	00010000/int16	0	0	1	0 / 0	"S233"	
465	00010000/int16	0	0	1	0 / 0	"S234"	
466	00010000/int16	0	0	1	0 / 0	"S235"	
467	00010000/int16	0	0	2	0 / 0	"S236"	
468	00010000/int16	0	0	1	0 / 0	"S237"	
469	00010000/int16	0	0	1	0 / 0	"S238"	
470	00010000/int16	0	0	2	0 / 0	"S239"	
471	00010000/int16	0	0	4	0 / 0	"S240"	
472	00010000/int16	0	0	1	0 / 0	"S241"	
473	00010000/int16	0	0	1	0 / 0	"S242"	
474	00010000/int16	0	0	3	0 / 0	"S243"	
475	00010000/int16	0	0	1	0 / 0	"S244"	
476	00010000/int16	0	0	1	0 / 0	"S245"	
477	00010000/int16	0	0	1	0 / 0	"S246"	
478	00010000/int16	0	0	1	0 / 0	"S247"	
479	00010000/int16	0	0	1	0 / 0	"S248"	
480	00010000/int16	0	0	1	0 / 0	"S249"	
481	00010000/int16	0	0	1	0 / 0	"S250"	
482	00010000/int16	0	0	1	0 / 0	"S251"	
483	00010000/int16	0	0	1	0 / 0	"S252"	
484	00010000/int16	0	0	41	0 / 0	"S253"	
485	00010000/int16	0	0	41	0 / 0	"S254"	
486	00010000/int16	0	0	41	0 / 0	"S255"	
487	00010000/int16	0	0	41	0 / 0	"S256"	
488	00010000/int16	0	0	41	0 / 0	"S257"	
489	00010000/int16	0	0	16	0 / 0	"S258"	
490	00010000/int16	0	0	16	0 / 0	"S259"	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
491	00010000/int16	0	0	16	0 / 0	"S260"	
492	00010000/int16	0	0	16	0 / 0	"S261"	
493	00010000/int16	0	0	16	0 / 0	"S262"	
494	00010000/int16	0	0	16	0 / 0	"S263"	
495	00010000/int16	0	0	16	0 / 0	"S264"	
496	00010000/int16	0	0	16	0 / 0	"S265"	
497	00010000/int16	0	0	16	0 / 0	"S266"	
498	00010000/int16	0	-1	39	0 / 0	"S267"	
499	00010000/int16	0	-1	39	0 / 0	"S268"	
535	00010000/int16	0	0	18	0 / 0	"S269"	1.)
536	00010000/int16	0	0	18	0 / 0	"S270"	1.)

1.) from Software –C9 onwards

Freely interconnectable area

380	01010000/ os2	26	00	00C0	0 / 0	"FDEF"	
381	01010000/ os2	59	00	00FF	0 / 0	"FD_I"	
382	01010000/ os2	42	00	00FF	0 / 0	"FD_O"	
383	01010000/ os2	98	00	005E	0 / 0	"FCON"	
384	01010000/ os2	31	00	001A	0 / 0	"FPOS"	

Processvalues (read only)

329	10000010/int16	0	-199.9	199.9	0 /7FH	"we_d"	
330	10000010/int16	0	-199.9	199.9	0 /7FH	"xds "	
331	10000010/bs16	0	0000	FFFF	0 / 0	"BA "	1.)
332	10000010/bs16	0	0000	FFFF	0 / 0	"BE "	2.)
333	10000010/int16	0	-199.9	199.9	0 /7FH	"AA1 "	
334	10000010/int16	0	-199.9	199.9	0 /7FH	"AA2 "	
335	10000010/int16	0	-199.9	199.9	0 /7FH	"AA3 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
336	10000010/int16	0	-199.9	199.9	0 /7FH	"AA4 "	
337	10000010/int16	0	-199.9	199.9	0 /7FH	"Y1 "	
338	10000010/int16	0	-199.9	199.9	0 /7FH	"Y2 "	
339	10000010/int16	0	-199.9	199.9	0 /7FH	"Y "	
340	10000010/int16	0	-199.9	199.9	0 /7FH	"xd_1"	
341	10000010/int16	0	-199.9	199.9	0 /7FH	"x_1 "	
342	10000010/int16	0	-199.9	199.9	0 /7FH	"w_1 "	
343	10000010/int16	0	-199.9	199.9	0 /7FH	"wi_1"	
344	10000010/int16	0	-199.9	199.9	0 /7FH	"xv_1"	
345	10000010/int16	0	-199.9	199.9	0 /7FH	"wv_1"	
346	10000010/int16	0	-199.9	199.9	0 /7FH	"Y_1 "	
347	10000010/int16	0	-199.9	199.9	0 /7FH	"xd_2"	
348	10000010/int16	0	-199.9	199.9	0 /7FH	"x_2 "	
349	10000010/int16	0	-199.9	199.9	0 /7FH	"w_2 "	
350	10000010/int16	0	-199.9	199.9	0 /7FH	"wi_2"	
351	10000010/int16	0	-199.9	199.9	0 /7FH	"Y_2 "	
352	10000010/int16	0	-199.9	199.9	0 /7FH	"E1 "	
353	10000010/int16	0	-199.9	199.9	0 /7FH	"E2 "	
354	10000010/int16	0	-199.9	199.9	0 /7FH	"E3 "	
355	10000010/int16	0	-199.9	199.9	0 /7FH	"E4 "	
356	10000010/int16	0	-199.9	199.9	0 /7FH	"E5 "	
357	10000010/int16	0	-199.9	199.9	0 /7FH	"E6 "	
358	10000010/int16	0	-199.9	199.9	0 /7FH	"AE1A"	
359	10000010/int16	0	-199.9	199.9	0 /7FH	"AE2A"	
360	10000010/int16	0	-199.9	199.9	0 /7FH	"AE3A"	
361	10000010/int16	0	-199.9	199.9	0 /7FH	"AE4A"	
362	10000010/int16	0	-199.9	199.9	0 /7FH	"AE5A"	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
363	10000010/int16	0	-199.9	199.9	0 /7FH	"AE1 "	
364	10000010/int16	0	-199.9	199.9	0 /7FH	"AE2 "	
365	10000010/int16	0	-199.9	199.9	0 /7FH	"AE3 "	
366	10000010/int16	0	-199.9	199.9	0 /7FH	"AE4 "	
367	10000010/int16	0	-199.9	199.9	0 /7FH	"AE5 "	
368	10000010/bs16	0	0	FFFF	0 / 0	"ST8 "	3.)
369	10000010/bs16	0	0	FFFF	0 / 0	"STN "	4.)
370	----------						n.def.
371	10000010/bs16	0	0	00FF	0 / 0	"ST3 "	5.)
500	10000000/bs16	0	0	00FF	0 / 0	"ST10"	8.)
501	10000010/bs16	0	0	FFFF	0 / 0	"ST11"	9.)
502	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE6A"	
503	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE7A"	
504	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE8A"	
505	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE9A"	
506	10000010/int16	0	-199.9	199.9	0 / 7FH	"AEAA"	
507	10000010/int16	0	-199.9	199.9	0 / 7FH	"AEBA"	
508	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE6 "	
509	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE7 "	
510	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE8 "	
511	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE9 "	
512	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE10"	
513	10000010/int16	0	-199.9	199.9	0 / 7FH	"AE11"	
514	10000010/int16	0	-199.9	199.9	0 / 7FH	"E7 "	
515	10000010/int16	0	-199.9	199.9	0 / 7FH	"E8 "	
516	10000010/int16	0	-199.9	199.9	0 / 7FH	"E9 "	
517	10000010/int16	0	-199.9	199.9	0 / 7FH	"E10 "	

	Description element (subindex)						
PNU (dez)	Identification/ datatype	Array numb.	min value	max value	variabl/ convers. index	Name	Note
518	10000010/int16	0	-199.9	199.9	0 / 7FH	"E11 "	
519	10000010/int16	0	-199.9	199.9	0 / 7FH	"E12 "	
520	10000010/int16	0	-199.9	199.9	0 / 7FH	"AA5 "	
521	10000010/int16	0	-199.9	199.9	0 / 7FH	"AA6 "	
522	10000010/int16	0	-199.9	199.9	0 / 7FH	"AA7 "	
523	10000010/int16	0	-199.9	199.9	0 / 7FH	"AA8 "	
524	10000010/int16	0	-199.9	199.9	0 / 7FH	"AA9 "	
525	10000010/int16	0	-199.9	199.9	0 / 7FH	"Y3 "	
526	10000010/int16	0	-199.9	199.9	0 / 7FH	"Y4 "	

Processdata (read-/writeable)

PNU (dez)	Description element (subindex) Identification/datatype	Array numb.	min value	max value	variabl/convers. index	Name	Note
372	10000000/int16	0	-10.0	110.0	0 /7FH	”w_es”	
373	10000000/bs16	0	0	00FF	0 / 0	”STes”	6.)
374	10000000/int16	0	-10.0	110.0	0 /7FH	”Y_es”	
375	10000000/bs16	0	0	00FF	0 / 0	”ST5 ”	7.)
376	10000000/bs16	0	0	FFFF	0 / 0	”STBA”	11.)
377	10000000/int16	0	-10.0	110.0	0 /7FH	”w1es”	
378	10000000/int16	0	-10.0	110.0	0 /7FH	”w2es”	
379	10000000/int16	0	-10.0	110.0	0 /7FH	”YHes”	
527	10000000/int16	0	-10.0	110.0	0 / 7FH	”YHes2”	
528	10000000/bs16	0	0	00ff	0 / 0	”ST20”	10.)
529	10000000/int16	0	-10.0	110.0	0 / 7FH	”Wes2”	
530	10000000/int16	0	-10.0	110.0	0 / 7FH	”Yes2”	
531	10000000/int16	0	-199.9	199.9	0 / 7FH	”SAA1”	
532	10000000/int16	0	-199.9	199.9	0 / 7FH	”SAA2”	
533	10000000/int16	0	-199.9	199.9	0 / 7FH	”SAA3”	
534	10000000/int16	0	-199.9	199.9	0 / 7FH	”SAA4”	

Meaning of the bits:

1.) PNU 331: readable binary outputs ”BAxx”
11.) PNU 376: writeable binary outputs ”StBA”

BIT 15: BA8	BIT 7: BA16
BIT 14: BA7	BIT 6: BA15
BIT 13: BA6	BIT 5: BA14
BIT 12: BA5	BIT 4: BA13
BIT 11: BA4	BIT 3: BA12
BIT 10: BA3	BIT 2: BA11
BIT 9: BA2	BIT 1: BA10
BIT 8: BA1	BIT 0: BA9

2.) PNU 332: binary inputs "BExx"

BIT 15: BE8	BIT 7: x
BIT 14: BE7	BIT 6: x
BIT 13: BE6	BIT 5: BE14
BIT 12: BE5	BIT 4: BE13
BIT 11: BE4	BIT 3: BE12
BIT 10: BE3	BIT 2: BE11
BIT 9: BE2	BIT 1: BE10
BIT 8: BE1	BIT 0: BE9

3.) PNU 368: Status "ST8"

BIT 15: CB	BIT 7: BLS
BIT 14: He	BIT 6: BLPS
BIT 13: Si	BIT 5: PAU
BIT 12: N	BIT 4: controller I,II (Override)
BIT 11: P/PI (I)	BIT 3: +dy
BIT 10: P/PI (II)	BIT 2: -dy
BIT 9: +yBL	BIT 1: +dw
BIT 8: -yBL	BIT 0: -dw

4.) PNU369: Status "STN"

BIT 15: manual (I) changed	BIT 7: manual (II) changed
BIT 14: X	BIT 6: tS_STOP (I)
BIT 13: MUFS	BIT 5: tS_STOP (II)
BIT 12: contr.I,II(Overr.)	BIT 4: Internal (I)
BIT 11: A4	BIT 3: Internal (II)
BIT 10: A3	BIT 2: X
BIT 9: A2	BIT 1: H
BIT 8: A1	BIT 0: Yext

Function BIT 15: from software –C7 onwards
Function BIT 7 : from software –C7 onwards
Function BIT 6 : from software –C9 onwards
Function Bit 5 : from software –C9 onwards

5.) PNU 371: Status "ST3"

BIT 15: 0	BIT 7: LBQ last change H/I
BIT 14: 0	BIT 6: Y0-Error (PAST)
BIT 13: 0	BIT 5: X
BIT 12: 0	BIT 4: tv-Error
BIT 11: 0	BIT 3: Sum-Error
BIT 10: 0	BIT 2: ncon Error
BIT 9: 0	BIT 1: -Pos Error
BIT 8: 0	BIT 0: nPos Error

6.) PNU 373: Status ”STes” (writeable)

BIT 15: 0	BIT 7: CB
BIT 14: 0	BIT 6: H
BIT 13: 0	BIT 5: Si
BIT 12: 0	BIT 4: N
BIT 11: 0	BIT 3: P/PI (I)
BIT 10: 0	BIT 2: P/PI (II)
BIT 9: 0	BIT 1: +yBL
BIT 8: 0	BIT 0: -YBL

7.) PNU 375: Status ”ST5” (writeable)

BIT 15: 0	BIT 7: BLS
BIT 14: 0	BIT 6: BLPS
BIT 13: 0	BIT 5: PAU
BIT 12: 0	BIT 4: Intern (I)
BIT 11: 0	BIT 3: Intern (II)
BIT 10: 0	BIT 2: tS (I)
BIT 9: 0	BIT 1: wSL(I)
BIT 8: 0	BIT 0: BLB

8.) PNU 500: Status ”ST10”

BIT 15: 0	BIT 7: CB (II)
BIT 14: 0	BIT 6: H (II)
BIT 13: 0	BIT 5: Si (II)
BIT 12: 0	BIT 4: N (II)
BIT 11: 0	BIT 3: LBQ (II)
BIT 10: 0	BIT 2: tS (II)
BIT 9: 0	BIT 1: +yBL (II)
BIT 8: 0	BIT 0: -yBL (II)

9.) PNU 501: Status ”ST11”

BIT 15: MUF AE8	BIT 7: Option-Error
BIT 14: MUF AE7	BIT 6: tS (I)
BIT 13: MUF AE6	BIT 5: BLB
BIT 12: MUF AE5	BIT 4: wSL (I)
BIT 11: MUF AE4	BIT 3: wSL (II)
BIT 10: MUF AE3	BIT 2: MUF AE11
BIT 9: MUF AE2	BIT 1: MUF AE10
BIT 8: MUF AE1	BIT 0: MUF AE9

10.) PNU 528: Status ”ST20” (writeable)

BIT 15: 0	BIT 7: CB (II)
BIT 14: 0	BIT 6: H (II)
BIT 13: 0	BIT 5: Si (II)
BIT 12: 0	BIT 4: N (II)
BIT 11: 0	BIT 3: wSL (II)
BIT 10: 0	BIT 2: tS (II)
BIT 9: 0	BIT 1: +yBL (II)
BIT 8: 0	BIT 0: -yBL (II)

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